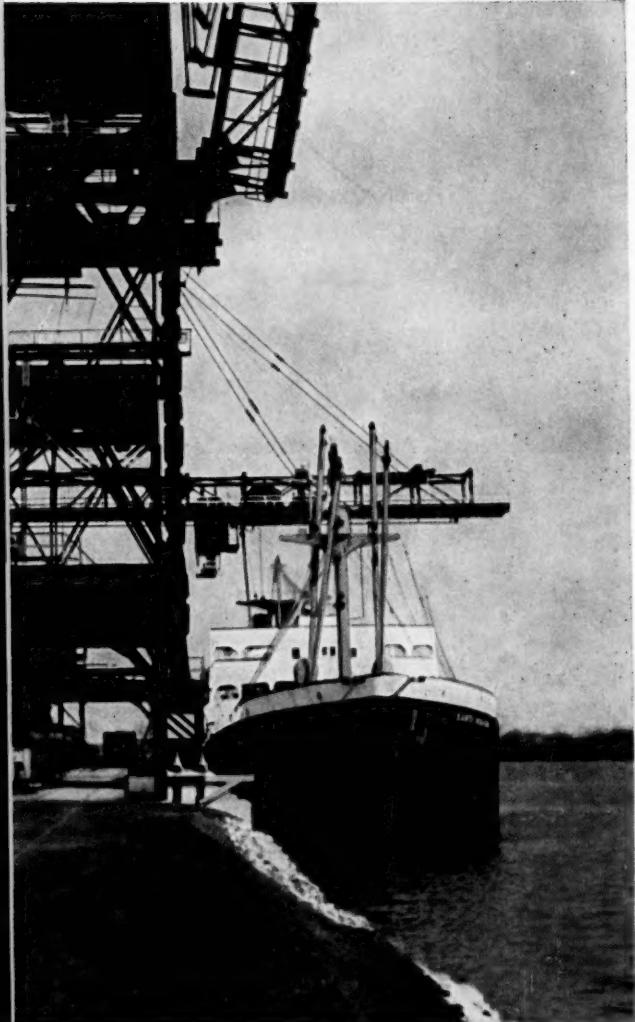


Chemical Week

August 31, 1957

Price 35 cents



Congress is going home—raft of pending business measures stay behind p. 40

Do cattle need tranquilizers?
'Yes' means hefty new market for drugmakers p. 44

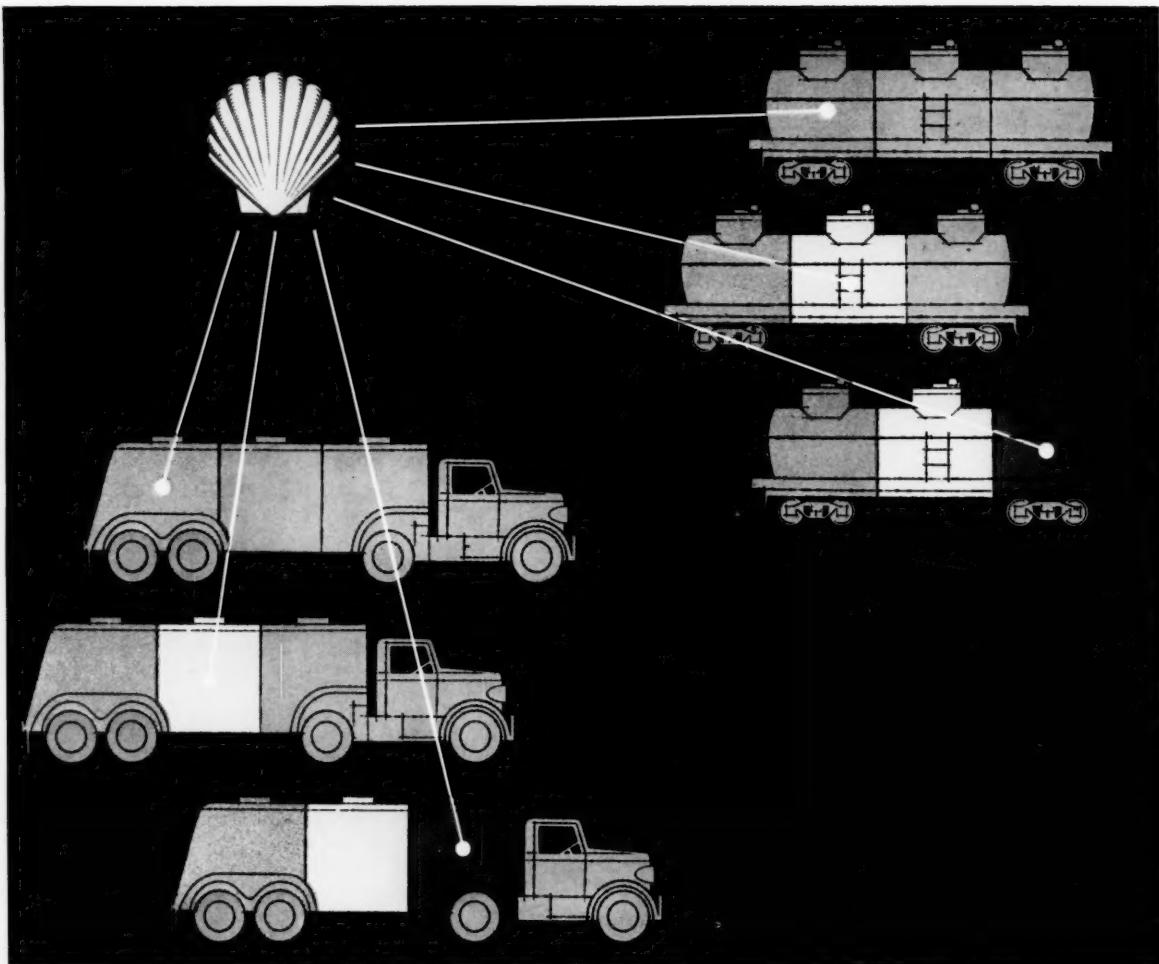
Town with a chemical future:
Victoria, Tex., rings with big-plant expansions . . . p. 57

Newest borax mine cuts costs.
Key: novel application of open-pit recovery . . . p. 76

◀ Inland waterways: chemical shipments swell a record tide of traffic p. 92

A M C G R A W - H I L L

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BUYING SOLVENTS?

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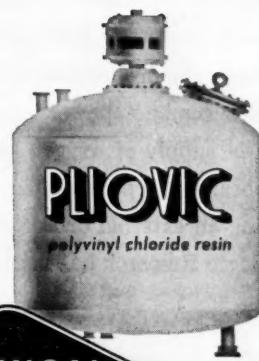
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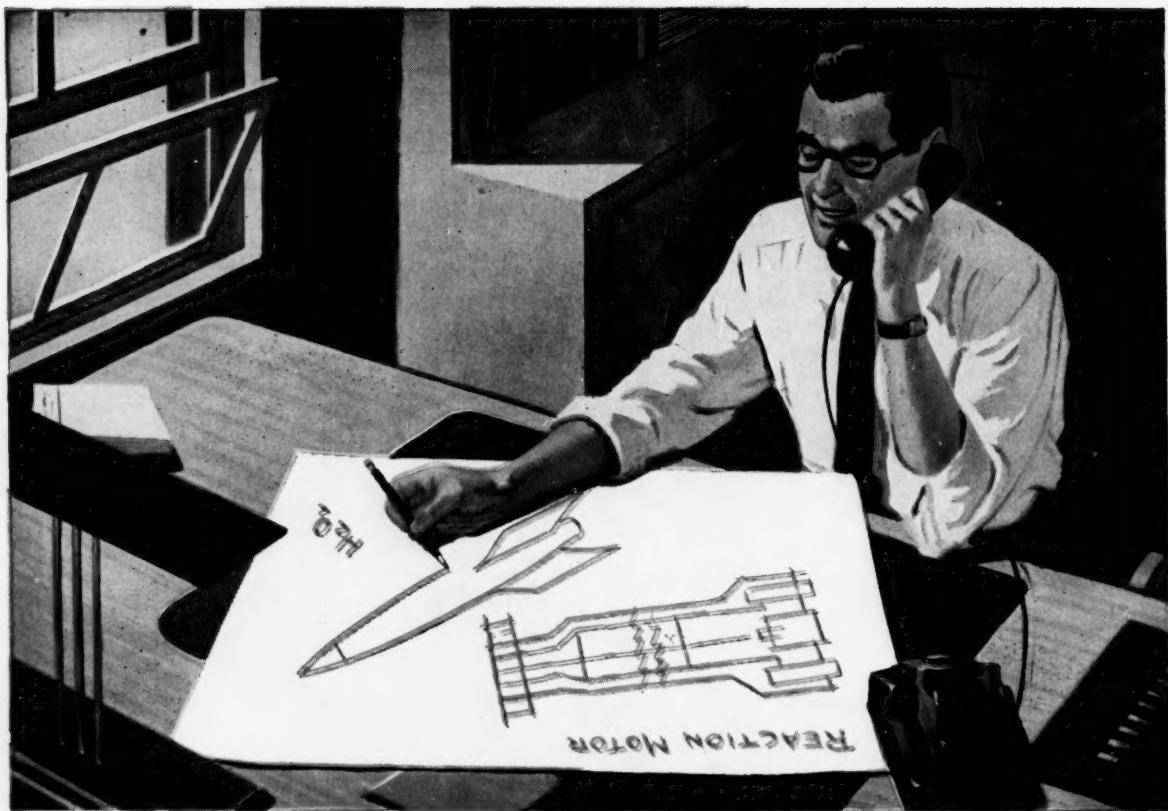
In addition to calendered goods, versatile Pliovic S70 can also be used to advantage in critical molded and extruded applications. Moreover, it offers an excellent means of modifying or "tempering" high-modulus stocks for greater utility of equipment and production of a wider range of products. For details, including the latest *Tech Book Bulletins*, write to: Goodyear, Chemical Division, Dept. H-9417, Akron 16, Ohio.

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Chemical Week

TOP OF THE WEEK

August 31, 1957

- **South Carolina's mineral deposits get new look-over** from aluminum, phosphate and heavy-metals producersp. 39
- **Ford's new car, the Edsel.** Chemicals, too, are in Ford's future, as suppliers get word to submit samples of water-based finishesp. 42
- **A new way to control polymer formation, "open-end" technique,** gets the eye from at least two large plastics producers p. 48
- **U.S. Bureau of Mines puts new tantalum-columbium process—** which purifies and separates the metals—into pilot-plant testp. 84
- **Natural rubber producers begin to fight,** study blueprint for combating the inroads of synthetic rubber on total market p. 109

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31 MEETINGS

35 BUSINESS NEWSLETTER

39 Will South Carolina become a major mining state? Current moves by alumina, phosphate and heavy-metal companies may indicate a trend.

40 As Congress is adjourning, it leaves a high stack of bills of chemical significance among its unfinished business.

42 Syntex is in a hassle over steroids again with suits—and countersuits— involving Merck and Schering. New top-level jobs were created last week by three firms. The new Edsel—its styling hides a significant fact: Ford may switch to water-base priming paints.

44 RESEARCH

Are tranquil cattle better weight-gainers? Tranquilizer makers see new profits—if research proves out.

48 Novel research with open-end "living" polymers should have commercial significance.

51 WASHINGTON NEWSLETTER

55 ADMINISTRATION

Continuing expansion by Du Pont, Carbide and Alcoa puts spotlight on Victoria, Tex., area.

62 Moves for stronger multiplant bargaining, noncontributory pensions, and chemical union merger endorsed at OCAW convention.

64 Starting salaries for new chemical engineers and chemists found lower than for some other fledgling technologists.

76 ENGINEERING

U.S. Borax will soon be working the world's first open-pit borax mine, will operate its new refinery right alongside.

82 U.S. Bureau of Mines' new liquid-liquid extraction process purifies tantalum/columbium mixture.

89 TECHNOLOGY NEWSLETTER

92 SALES

Inland waterways gain 35% in total traffic—but chemical shipments rise 150% in similar period.

105 MARKET NEWSLETTER

109 MARKETS

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116 Aluminum sulfate use may hit 1 million tons/year by '65.

123 PRODUCTION

The \$500-million/year work-clothes market is being actively looked at by synthetic fiber makers.

128 SPECIALTIES

Pet animal remedies and grooming aids become a big specialty market. Current total: \$15 million/year.

138 CHARTING BUSINESS

All-industry's research spending continues to grow.

COVER PHOTO COURTESY STEELWAYS, AMERICAN IRON & STEEL INSTITUTE

Vol. 81
No. 9

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., Inc. 330 W. 42nd St., New York 36, N. Y. Printed in U. S. A. Second-class mail privileges authorized at Philadelphia, Pa. Copyright 1957 by McGraw-Hill Publishing Co., Inc. All rights reserved. Subscription: \$3/year in U. S. and U. S. possessions; \$4, Canada; \$15, other Western Hemisphere countries; \$25, all other countries. Also see p. 33.

Watch CW Grow — 36,763 copies of this issue printed

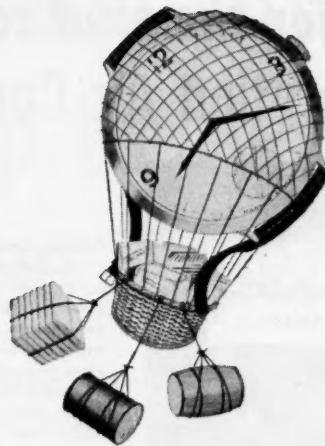
HOW THE SWISS WATCH GIVES AMERICAN CHEMICALS

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TO SWITZERLAND

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TO SWITZERLAND

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A \$34,027,000 LIFT

Quite a shuttle, that little Swiss watch.

Every hour, it helps move some \$3,884 worth of American chemicals to Switzerland. \$93,225 a day in pharmaceuticals, sulphur, methyl alcohol, flaxen oils, machinery oils, aniline dyes and resin. \$34,027,000 worth last year alone!

What makes the Swiss watch such a power-house? Just little-Swiss-schoolhouse economics. Common-sense economics. The Swiss buy American goods with the proceeds of what they sell over here. About half their sales are the products of their three-hundred-year-old watch industry. And the Swiss pay as good customers do—in cash! It's all trade. No aid.

As a matter of fact, Switzerland is America's best cash customer in Europe. A customer who has spent in America every dollar she has earned in America since 1946—plus 50% more. American business has gained a fat, favorable trade balance of \$500,000,000!

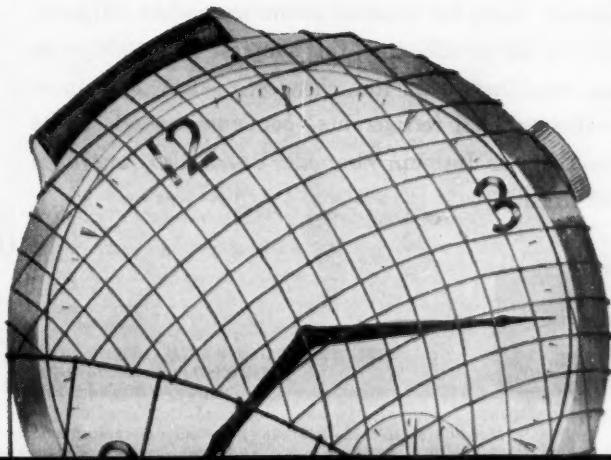
The present chapter in this bright business romance opened with the reciprocal trade agreements of 1936 between our two democracies. But the next chapter could tell a different story.

In 1954, America hiked the tariff on jeweled-lever Swiss watch imports by a huge 50%. Since then, further restrictions are being considered. And they could price the Swiss watch right off the wrists of Americans! Everyone who sells to Switzerland can easily foresee what this can lead to.

It's a tough problem. But, as a wise man remarked: "A problem clearly stated is a problem half solved." To men of good will and good business, the problem is clear. Surely, good will and good business, together, can solve it.

*Published in recognition of the
106th anniversary of The Treaty of Friendship
and Commerce pledged between the people
of America and the people of Switzerland*

THE WATCHMAKERS OF SWITZERLAND



Carrier

Major chemical concept in Absorption Air Conditioning



Celanese
CORPORATION OF AMERICA

Production area where Fortisan-36 is made and spun. Processing temperatures that approach 130°F. require comfortable cooling for efficient work.

Temperatures in the production area of Celanese Corporation of America's new fiber manufacturing plant at Rome, Georgia, where the new super-strong industrial rayon yarn

Fortisan-36 is made and spun, would rise as high as 130°F. if the building were not comfortably cooled. To permit manufacturing personnel to work efficiently, a Carrier Absorption Refrigeration Machine of 518 tons capacity was installed to provide chilled water for the plant's existing air handling system, which is also Carrier. Using low pressure steam to produce refrigeration for air conditioning, this simplest of all refrigerating machines uses the cheapest, safest and most available of all refrigerants—common tap water. Its absorbent is Lithium Bromide Brine, also known as "Carrene 16".

member of...

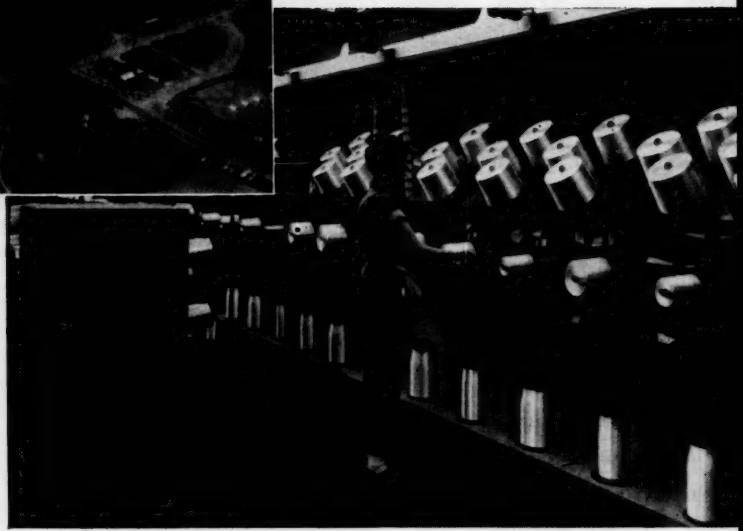


PROCESSORS OF LITHIUM METAL • METAL DISPERSIONS
METAL DERIVATIVES: Amide • Hydride

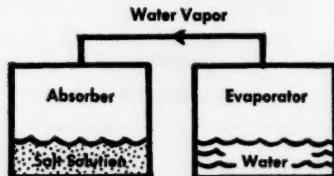
SALTS: Bromide • Carbonate • Chloride • Hydroxide • Nitrate

SPECIAL COMPOUNDS: Aluminate • Borate • Borosilicate • Cobaltite • Manganite
Molybdate • Silicate • Titanate • Zirconate • Zirconium Silicate

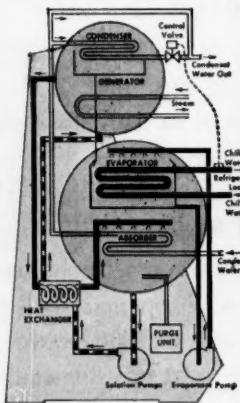
Celanese Corporation of America, Rome, Georgia plant. Producers of Fortisan-36, a regenerated cellulose yarn made from wood pulp by an entirely new process. Expected to fill the gap between industrial steel wire and high-tensile rayon and glass, this new synthetic, a product of four years research and development, is expected to be used in high-pressure hose, V-belts, webbing, paper laminate reinforcing, Army tents and rubber tires.



HOW CARRIER'S ABSORPTION REFRIGERATION CYCLE OPERATES



The simplest cycle diagram would include Evaporator and Absorber (upper left). Consider these two closed vessels with salt (Lithium Bromide) solution in one and plain water in the other. Just as common table salt absorbs water vapor from the air on a damp day, the Lithium Bromide salt solution in the absorber has affinity for water vapor and evaporates some of the water. Water that remains in the evaporator tank is thus chilled by evaporation and thereby produces a refrigeration effect. In actual operating practice a condenser and generator are combined in the upper shell of the machine, and the evaporator and absorber in the lower shell (see upper right cycle diagram).



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Carrier and Lithium Corporation team up to cool down Celanese Super-Yarn plant

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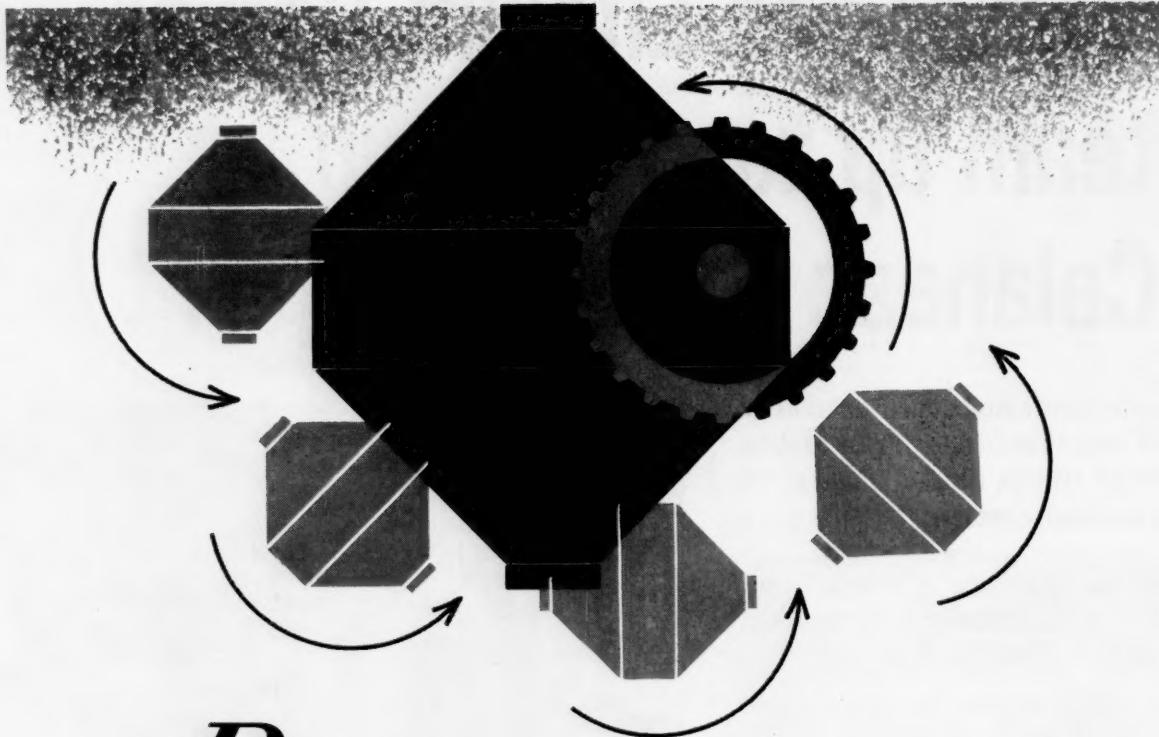
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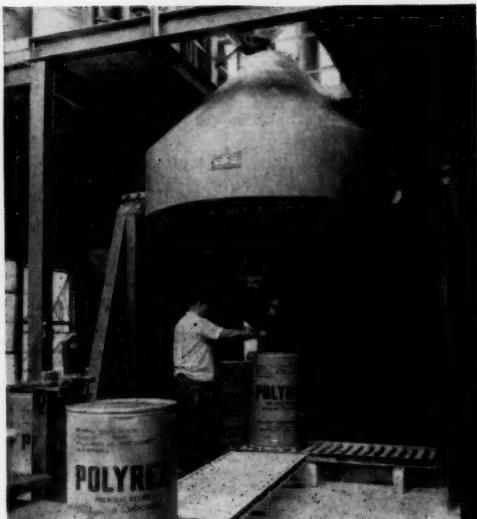


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ATLAS

chem-memos

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Atlas Powder Company, Canada, Ltd., Brantford, Ontario, Canada

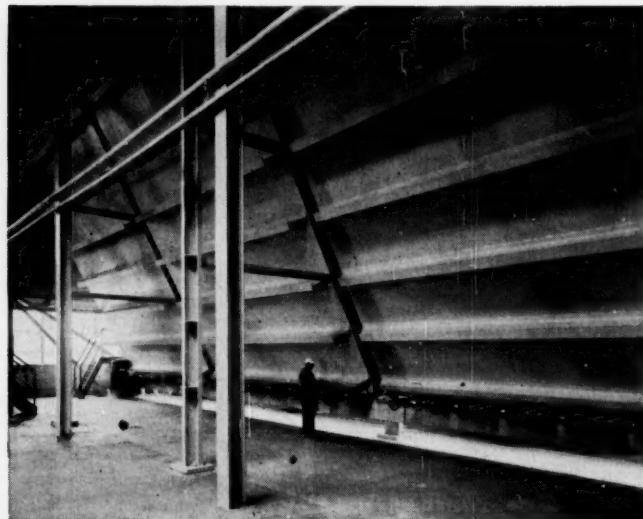
Atlas helps cosmetic chemists screen emulsifiers *more easily*

Any chemist who formulates emulsion products knows that it's a tough job to pick one or two "ideal" emulsifiers from the hundreds of surfactants on the market. As one of the world's largest producers of surfactants, Atlas has pioneered several methods for saving time and lab expense in preliminary screening of such products.

Latest of these time-savers for emulsion chemists is the Atlas "32" line, which was especially chosen and integrated for cosmetic formulating work. These 32 surfactants can be cross-blended to handle emulsification in any cosmetic formulation, thus eliminating tedious hours of checking other emulsifying agents. Each has been studied to determine its suitability for topical use. Atlas cosmetic development work and literature is centered on these 32 emulsifiers. They are stocked for fast delivery.



All members of the "32" line are described in our new cosmetic catalog. We'll be glad to send you a copy on request. If cosmetics doesn't happen to be your business, we'll be glad to send you our recommendations on the Atlas surfactants best suited for your specific problem in emulsification, dispersion, solubilizing, wetting, or static control. Call on us for samples and for a consultation on your particular requirements.



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DARCO® removes haze-producers, from beer, for example...

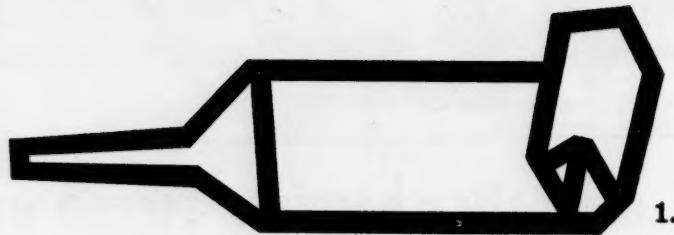
If you're making a product that could be improved by preventing haze or stabilizing taste, there's a good chance that DARCO could do the trick as it does for brewers. So, if you want to eliminate haze at its source, call on us for help on your specific problem. We're old hands in the haze-prevention business.



The few cases of beer out of every hundred that might get stalled in distribution channels before being consumed sometimes cause real worries for brewers, because beer is perishable. When it's stored too long, it can develop haze upon chilling, and its taste may become stale.

Many of the country's leading brewers are preventing this kind of trouble by treating their beer with DARCO BG. This treatment makes beer dearer when newly brewed, and keeps it clear twice as long as untreated beer. It also improves taste stability . . . but doesn't impair flavor or foam qualities.

One out of every three major brewers is now using DARCO BG. Nearly 20 per cent of all beer made today gets this simple, low-cost process.



1.

PFIZER RIDDLES -----



2.

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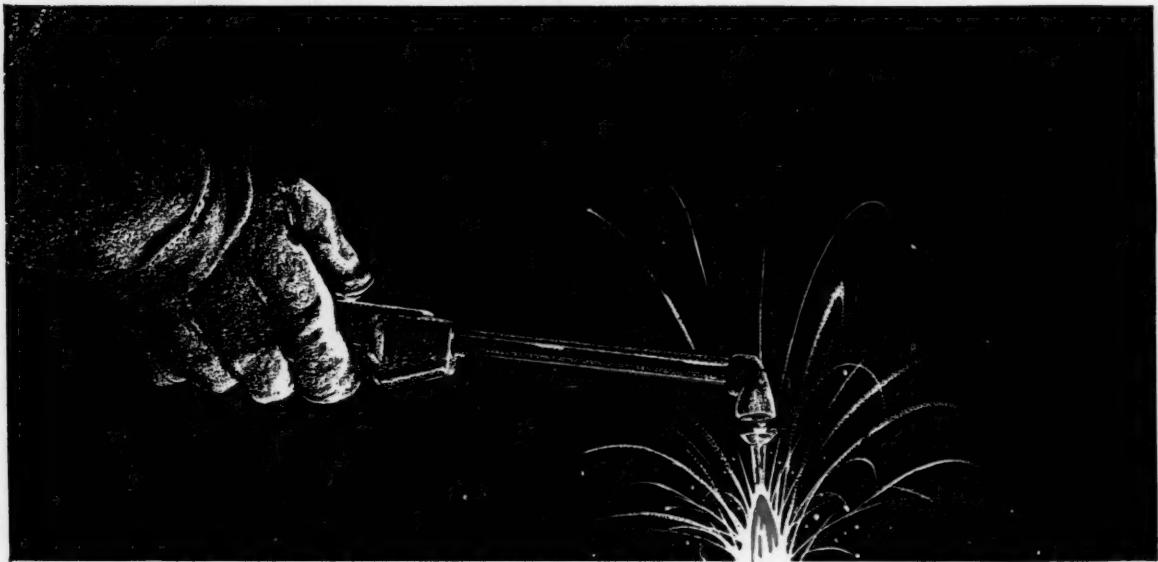
If you have a problem which might be solved by a high quality organic chemical, think of Pfizer first. Contact Dept. WP, Chas. Pfizer & Co., Inc., Chemical Sales Division, 630 Flushing Ave., Brooklyn 6, N. Y.

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...sells more than
100 organic chemicals
for food, medicinal and
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for an old flame!

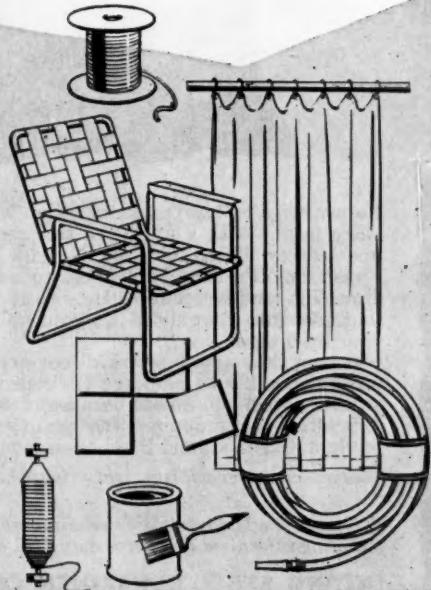
For years the use of acetylene commercially was limited primarily to the welding torch. Today, it is one of the brightest stars on the petrochemical horizon, with some 80% of total output serving as basic raw material for many of the "miracle" synthetic fibres and hundreds of other important plastic products, including *acrylic fibres, resins, solvents, and synthetic rubber*.

Key factor in the phenomenal growth of acetylene has been the recent development of processes for its production from natural gas. Among these new production techniques, the BASF process has had the greatest success, because of its commercially proven economy, safety and reliability.

With exclusive rights in all North American countries* for the BASF process, Chemico has designed and constructed facilities for the production of more than 150,000,000 pounds per year capacity of acetylene. This total includes the world's largest plant for producing acetylene from natural gas. This experience enables CHEMICO's highly skilled staff to handle acetylene projects with maximum efficiency and economy.

*On occasion those rights have been extended to other areas, through special arrangement with BASF.

If you are interested in the profit making opportunities offered by acetylene, we suggest you send for CHEMICO's new acetylene brochure (Bulletin No. 257), which will give you more detailed information on the BASF process and CHEMICO's experience in this field.



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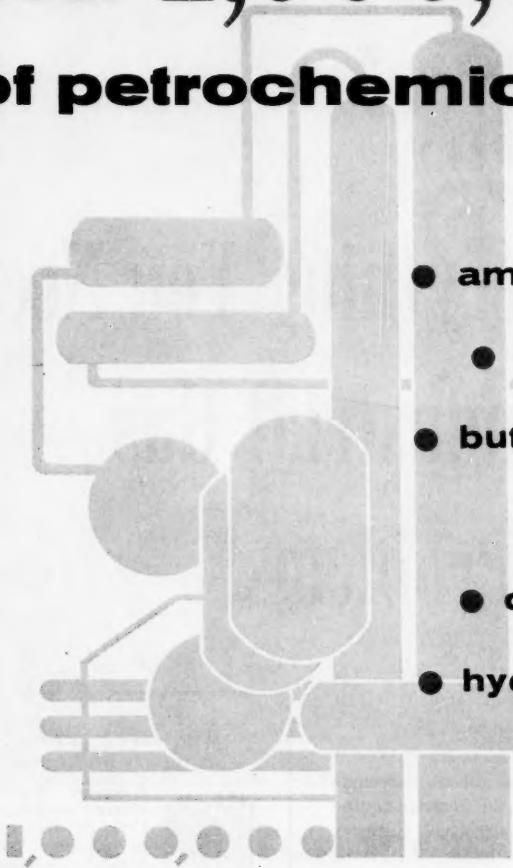
ists went to work and developed a custom-made lining that would keep Newark leather finish completely free from contamination in transit and during storage. Result: a successful finish and an end to Newark's packaging problems.

Want to write a finish to your packaging problems? Just contact Inland Steel Container. Once you see what Inland can do for you, you'll agree with Hans Haemisegger (Chief Chemist of Newark Leather Finish Co.) who says, "Inland is the finest drum made." Write Bob Boecher, Dept. 333E.



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Dystrip, developed by Uiano Products Co., in conjunction with the U. S. Air Force.

Topographical maps in minutes instead of hours

Glycerine is the plasticizer in a new process for making area color separations and negatives. Government map makers report that the new process effects time savings of as much as 60 to 1 in preparing maps for reproduction.

In the new process, a plastic sheet is sensitized and contact printed. The sheet then is plasticized with Glycerine, allowing line-bounded areas to be stripped out easily. Dyeing converts the image into an opaque color separation.

Glycerine has also found application in more conventional reproduction processes. It is widely used as a plasticizer for printing ink resins and as a humectant in stamp pads.

Glycerine's usefulness continues to grow. Stable in price, dependable in supply, Glycerine offers processors a unique balance of properties: It is hygroscopic, nontoxic, stable, nonvolatile, with excellent solvent power and agreeable taste. New applications for Glycerine are extending its use in paints, foods, pharmaceuticals, packaging and many other fields. For a useful 20-page booklet, "Glycerine Properties and Uses," write to:

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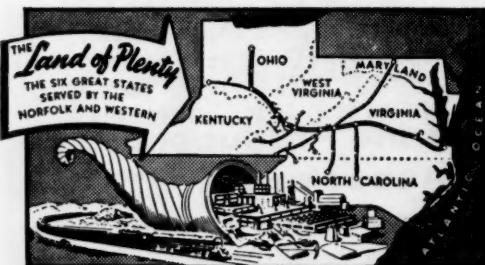
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U.S.I. CHEMICAL NEWS

August 31st ★

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

★ 1957

Chemical Polish for Pure Zinc Improved With Ethyl Alcohol

An improved polish for zinc, consisting of nitric acid, ethyl alcohol, and hydrogen peroxide has been developed by a leading research laboratory.

Immersion of pure zinc for about two minutes in a bath of these chemicals is said to produce a high and lasting luster that resists rapid oxidation up to temperatures of around 660°F in air or in a sodium-potassium nitrate salt bath.

The role of ethyl alcohol in this polish appears to be that of a moderator of the nitric acid. Although polishes composed of other chemicals have been used for zinc, the nitric acid-ethyl alcohol-hydrogen peroxide polish is said to have longer life and to produce on the zinc a thinner oxide film of increased stability.

It is recommended that users prepare the polish fresh daily. *Caution:* ethyl alcohol should never be poured into nitric acid; the reverse, however, may be done safely. Interested readers who wish detailed assistance may call on U.S.I.'s technical service staff.

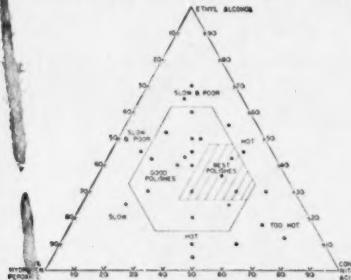


Diagram illustrates chemical polishing baths for zinc, based on 2 min. immersion time.
(Diagram from "Journal of Metals.")

New Centrifuges Underscore Titanium Strength

High speed centrifuges fabricated with an aluminum-vanadium alloy of titanium now are in operation on an experimental basis. They are reputed to run 28% faster than stainless, with no greater working stress in the bowls.

Steady increase in such applications of titanium is expected—namely, where high strength-weight ratio as well as corrosion resistance is needed. Titanium now can be alloyed, welded, and bonded with chrome (U.S.I. Chemical News, May, '57). With three times the strength of aluminum, but only half the density of steel, titanium has been in heavy demand for aircraft components subject to severe resonance conditions.

U.S.I. is building a titanium sponge plant at Ashtabula, Ohio, which is expected to go on stream late this year. This modern plant will employ a sodium reduction process, and on the basis of present figures will turn out high purity titanium sponge at lower cost than any other existing commercial technique.

Organosodium Compounds Open Way to Economical Synthesis of Many Organometallic Compounds

Higher Yields Than with Conventional Grignard Reagents; Safer, Simpler Processing Among Advantages Cited

Many organometallic compounds can now be synthesized economically and safely from organosodium compounds, according to a paper recently presented before the American Chemical Society. In some cases the latter compounds can be used as intermediates to prepare an otherwise hard-to-make Grignard reagent. In others they can be reacted directly with metal halides to form new carbon-metal bonds.

Grignard reagents, compounds of magnesium with an organic halide, have long been standard building blocks for synthesizing organometallic compounds. However, from the commercial standpoint many Grignard reagents are difficult and hazardous to prepare, some require costly iodides or bromides as starting materials, and yields of desired organometallic compounds are frequently disappointing.

Among the advantages of organosodium compounds cited by the investigators are high yields and safety and convenience in handling.

For example, phenylsodium reacts with boron trichloride to form triphenylborine in 70% yield. Benzylsodium and phosphorus trichloride produce tribenzylphosphorus in 84% yield. Also, in this whole class of reactions, sodium as a starting material is more economical than the magnesium of typical Grignard reagents. Finally, reactions proceed in a hydrocarbon medium, thus eliminating the hazard of storing and handling large quantities of ether, the solvent used with Grignard reagents.

Reactions of RNa Compounds

The route to organometallic compounds from metallic sodium employs two general reactions. In the first an organic halide is reacted with sodium to produce an organo-sodium compound:



This product is then reacted with a metallic halide to yield the desired organometallic compound:

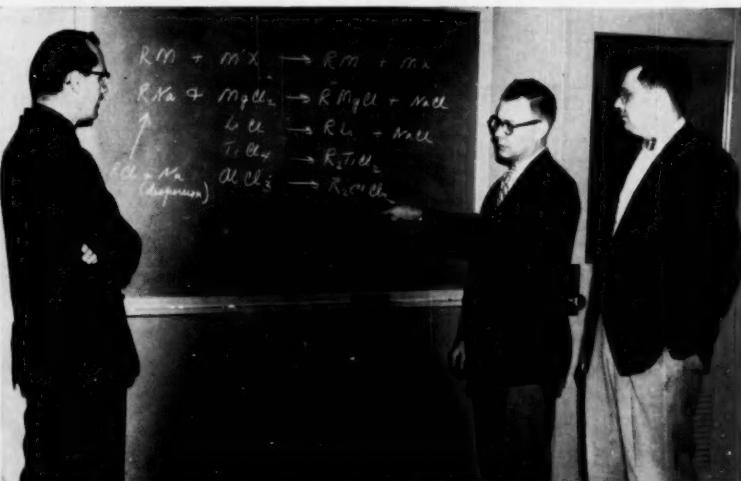


Organosodium compounds may react with the halides or alkoxides of lithium, magnesium, mercury, boron, aluminum, silicon, germanium, tin, lead, titanium, zirconium, phosphorus and iron.

Sodium Dispersions Key Factor

The recent introduction of simple and safe techniques for laboratory or plant preparation of finely dispersed sodium has stimulated wide interest in the use of organosodium compounds. Hansley's studies on preparation

MORE



John F. Nobis of U.S.I. research staff discusses with F. Moermeier (left) and R. E. Robinson (extreme right) equations for reaction of organosodium compounds to form various carbon-metal bonds. They presented a paper entitled "Use of Organosodium Compounds for Preparation of Other Carbon-Metal Bonds," at the Spring meeting of the American Chemical Society.

August 31st ★

U.S.I. CHEMICAL NEWS

★ 1957

CONTINUED ➤ **Organosodium**

and use of finely dispersed sodium (10-30 μ) to produce phenylsodium in 90% yields* opened a new era in organosodium chemistry.

Extensive research in U.S.I. laboratories shows that phenylsodium and benzylsodium can be made by carefully controlled conditions which include the presence of a slight excess of freshly dispersed sodium. The reaction between chlorobenzene and sodium under these conditions is immediate and complete: one mole of phenylsodium can be prepared in only 20 minutes. This reaction is easily adapted to larger scale and is now being used industrially.

The largest commercial plant utilizing organosodium compounds will soon be in operation at Tuscola, Illinois where U.S.I. is using disodiooctadiene, made directly from butadiene and dispersed sodium, to produce U.S.I. Isosebacic® acid, a mixture of 10-carbon dibasic acids.

(A new brochure on the preparation of sodium dispersions is available from U.S.I.)

Advantages of Organosodium

Until practical techniques for making sodium dispersions were developed, the reaction of an organosodium compound with magnesium chloride to produce a Grignard reagent had no commercial value. In general, it was easier to prepare Grignard reagents than the corresponding organosodium compounds. Now, however, there are cases where organosodium compounds can be made from starting materials which yield Grignard reagents only with difficulty. For example, organic chlorides react very sluggishly with magnesium, but yield organosodium compounds quite readily.

As a result, many Grignard reagents which have been prepared from expensive iodides or bromides can now be obtained from the cheaper chlorides, often in higher yields than are possible by the former method. Other organosodium compounds, synthesized by reactions which are completely unknown in the field of organomagnesium chemistry, can now be converted to hitherto unattainable Grignard reagents.

*V. L. Hansley, *I&EC* 43, 1759 (1951)

Cube-Shaped Polyethylene Containers for Corrosives Promote Lab Safety

An ingenious new container gives laboratory workers an almost accident-proof way to receive, store and dispense corrosive reagent chemicals.

The package consists of a cube-shaped polyethylene vessel inside a double corrugated paperboard box which serves as a shipping carton. The user need never remove the polyethylene cube from the box; the latter has a slotted opening for a pouring mouth on the cube and a pull-out safety grip for easy handling.

The new container is now being used by a leading manufacturer of reagent chemicals for packaging solutions of sodium hydroxide and potassium hydroxide in 1-gallon size.

It is light, unbreakable, and the unique design makes it convenient to dispense the contents. An economy feature is that no deposits are required, and there are no empties to return.



Polyethylene "Coating", "Lamination" Defined

An industry standard adopted by the National Flexible Packaging Assn. defines the difference between "coating" and "lamination", as these terms are applied to polyethylene packaging.

A coating is "a substance deposited while in a liquid state on web without the use of adhesive means between the combined materials". Lamination is "the combination of two or more webs by the use of an adhesive layer between the webs".

Coating is the more common method. U.S.I. PETROTHENE 203 is a polyethylene resin that is widely used for this application.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U. S. I.

New adhesives for labels feature resin emulsion glue which penetrates silicone layer to bond on the glass surface. The adhesives feature controlled tack in clear non-staining micro-thin films which are noncrystallizing, says company. **No. 1260**

A pamphlet on titanium tubing offers information on size range and tolerances and mechanical, physical and working properties of tubular titanium. **No. 1261**

A new remote control baffle for fume hoods is operated from an outside control panel. Manufacturer claims baffle can be quickly adjusted for any desired air flow aperture without interrupting work or exposing personnel to injury. **No. 1262**

A double acting rust remover is said to remove light rust in a few minutes, heavy rust in one to two hours. Deposits a rust-inhibiting film as it works, requires no rinsing of treated metal. **No. 1263**

A new booklet entitled "Zirconium and Hafnium" is now available. It covers in detail the mechanical and physical properties of the materials as well as general methods of fabrication and corrosion resistance. **No. 1264**

A new vinyl paint is said to achieve 5 to 8 times the film thickness per spray pass as other vinyl paints. Supplied in 8 colors, it is also said to be fast drying, easy to apply, economical, corrosion-resistant. **No. 1265**

Deuterated solvents and organo-metallics of high isotopic purity are now available in experimental quantities, with a wide range of research applications, including NMR spectroscopy. **No. 1266**

Color dispersion and intensity in plastics are said to be improved by a new extender. This product is also reported to increase lubricity, mold-release, and brightness of finish in many plastics. **No. 1267**

A continuous water vapor recorder determines low concentrations of water vapor in air or gas streams by measuring heat energy exchanged in adsorption or desorption. Designed for pipe lines, drying towers, feed streams. **No. 1268**

An external manipulator for tubing applies pressure externally on a flexible tube, producing a continuous, metered flow of liquids which can be as low as 0.1 cc. per day, according to the maker. **No. 1269**

A detector kit, small, compact and practical, rapidly determines low concentration of vapors of toluene diisocyanate and toluene diisocyanate urea. Said to be especially useful in plants making polyurethane plastics. **No. 1270**

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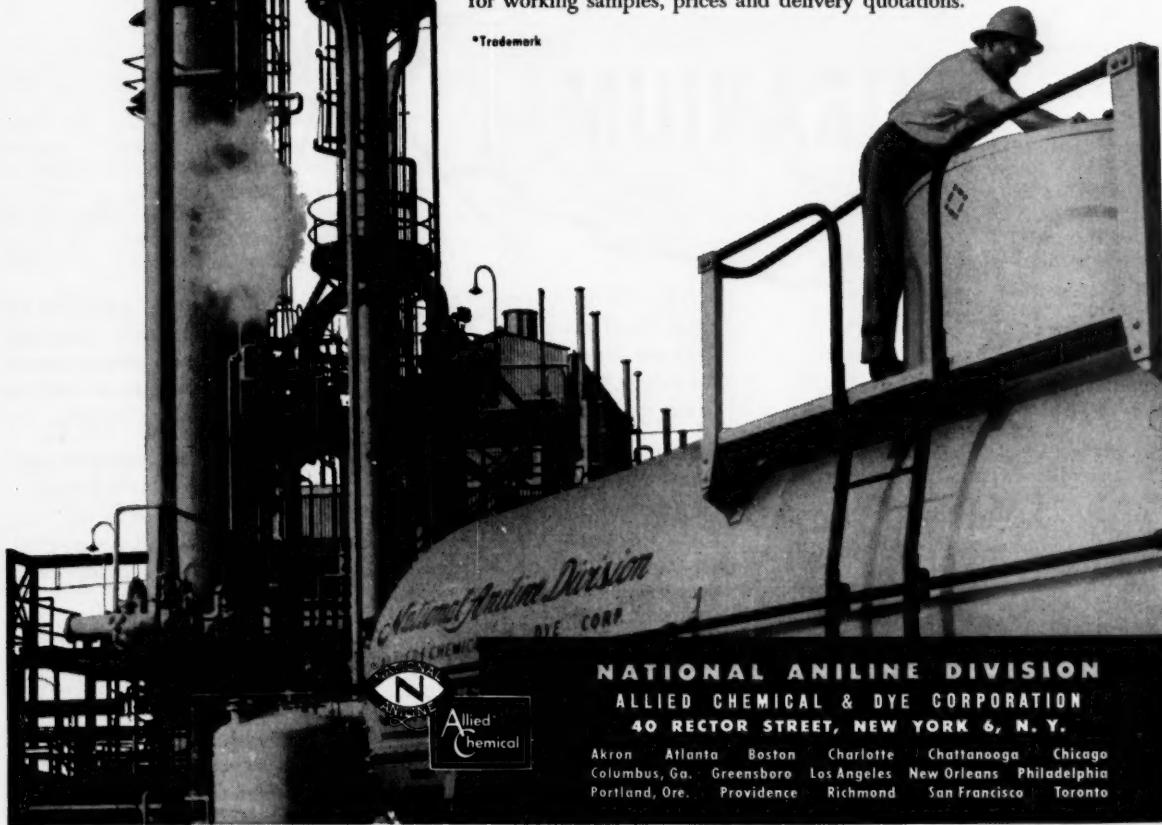
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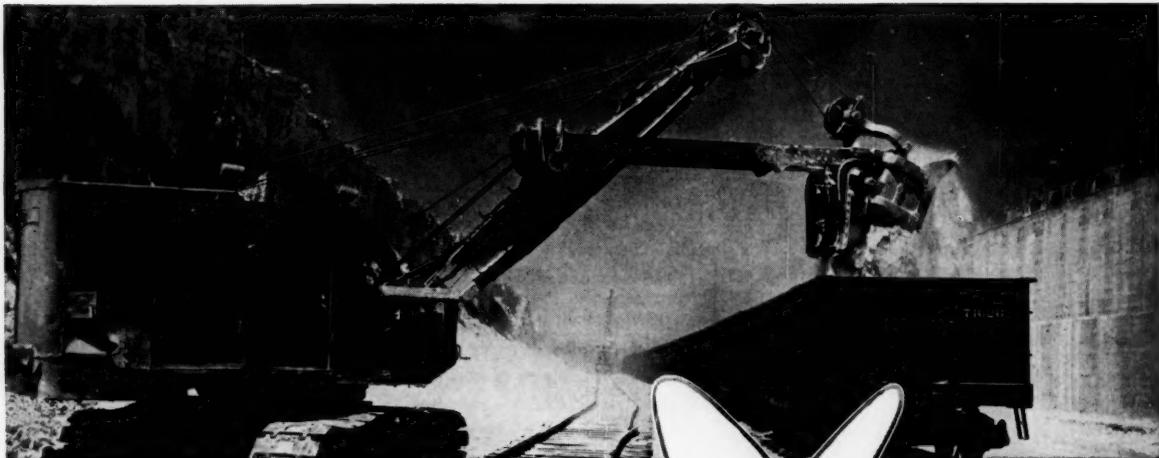
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Ore milling specialists have settled upon acid leaching as the most practical and economical way to extract uranium values from ore concentrates. And as with so many other ore-leaching processes, sulphuric acid appears to be the best of the solvents, considering costs and availability.

So chalk up another 'headline' end-use for this most widely used of all acids! But this very broadening demand for sulphur emphasizes the problem facing producers of the basic element SULPHUR. Search for new commercial sources goes on without let-up all over the world. This company is playing a leading role in this search.

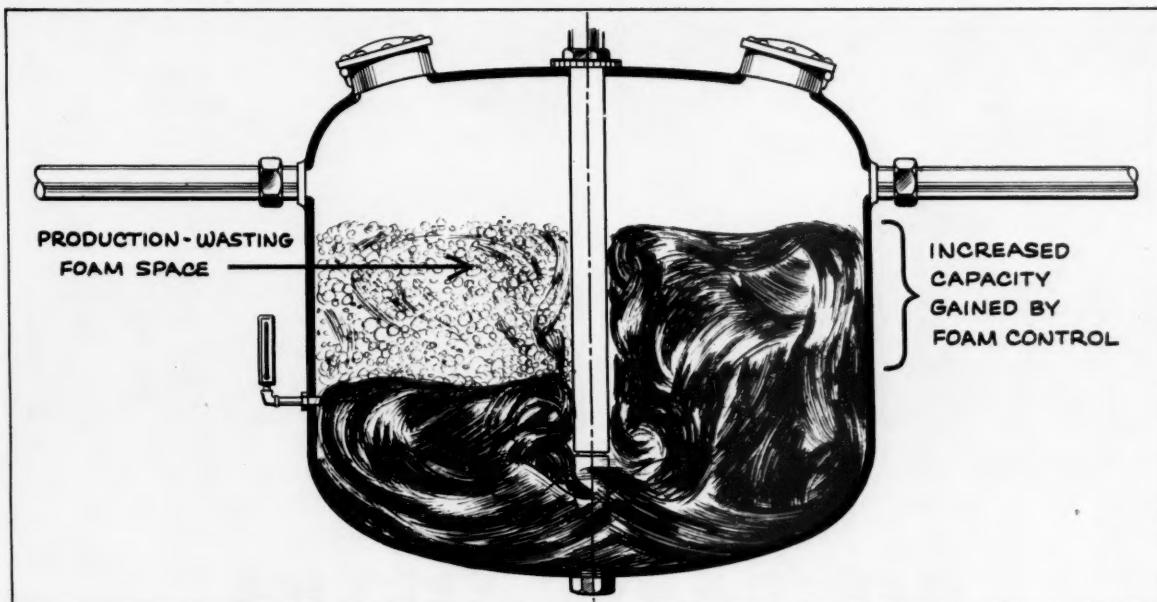


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Doubling reaction capacity on batch processing is one way

Defoamer PC-1244 Turns Froth Into Solid Profits

In the midst of double handfuls of defoamers, one newcomer is holding out a brand-new latchstring to greater profits for a variety of processors: Monsanto Defoamer PC-1244. Most available defoamers banish frothing in alkaline aqueous or organic media; this Monsanto come-lately compound works in acid organic media, even when water is sometimes present.

After a simple announcement of availability some months ago, a major oil company and a major paper company almost simultaneously zero'ed in on the compound for a problem common to both: controlling the foaming of wax dips. The oil company's interest was in foam control during processing of petroleum waxes; the paper company's aim was to control the foaming of hot wax blends when converting paper and boxboard to wax-coated end products. Unheralded Defoamer PC-1244 worked nicely for both . . . with an *added* advantage that the converter noticed: its presence seemed to control "bubbles" and improve leveling for a more even distribution of wax coating on the stock.

Although several oil companies have found the defoamer also useful in the blending of base stocks with oil additives, chemical makers are generating the big interest now; they are eyeing

Defoamer PC-1244 for some novel "processing" tricks.

What piques this interest is this: PC-1244 controls foaming of a wide variety of acidic organic chemicals *during reaction and processing*. Chemical makers with these foamy reactions in their plants sometimes find that one-third to one-half of their equipment capacity must be written off because of the need for header "foamspace" over the reactants. Now, by adding as little as 5 to 250 p.p.m. of PC-1244, they can fill the processing vessel to its design capacity—in effect getting from 50 to 100% *more production capacity* without buying more equipment.

While working with the defoamer, the question of water compatibility came up. Since PC-1244 is not soluble in water, Monsanto was dubious as to its effectiveness in reactions where some water was bound to be present. Undeterred, one user reported that he ran tests and found that 100 p.p.m. of PC-1244 knocked down the foam on a hydrocarbon mixture to which he had deliberately added an extra 1.5% water.

Degree of water tolerance aside, there seems to be plenty of jobs for the defoamer. Take catalyzed organic reactions where reactants should be

diluted to avoid localized decomposition or polymerization: all too frequently, dilution leads to foam troubles.

When acid organic media are involved, the foaming can be controlled with a tiny amount of PC-1244. And there's a lot of other applications under scrutiny, too: phenol extraction processes, alkyd resin cooking, dehydration of wood-preservative pressure-treating solutions, hydraulic fluids, and use in circulating oil systems.

PC-1244 itself is a clear, yellowish, oily liquid readily dispersible in oils and soluble in a number of common organic solvents. The defoamant is non-metallic; its active ingredient is a complex polymer which can be supplied in concentrate form (PC-1344) for special applications.

PC-1244: Monsanto Trademark

For further information on Defoamer PC-1244, request a copy of Chemical Specialties Data Report CS-7. Test samples available if requested on your company letterhead. Address: Monsanto Chemical Company, Organic Chemicals Division, Dept. CS-7, P. O. Box 478, St. Louis 1, Missouri.

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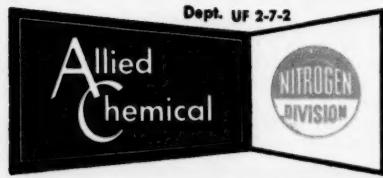
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What does this mean to you? Well, lithium and its compounds in a very few years have outgrown the laboratory curiosity stage to become important factors in chemistry . . . ceramics . . . greases . . . organic intermediates . . .

nuclear energy . . . to name but a few. Chances are that in the next five years you'll be investigating lithium as it might apply to your field. But when you do . . . before you invest time, effort, and money . . . your ideas will be thoroughly researched in this immense accumulation of data, by men who have played an important part in discovering the facts and creating the literature.

• • •

Write for *Chemical and Physical Properties of Lithium Compounds* and a taste of what Foote's store of lithium information has to offer you. This Data Bulletin is available on request to the Technical Literature Department, Foote Mineral Company, 420 Eighteen West Chelten Building, Philadelphia 44, Pa.



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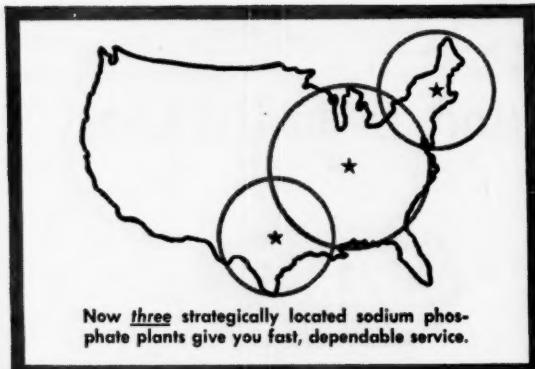
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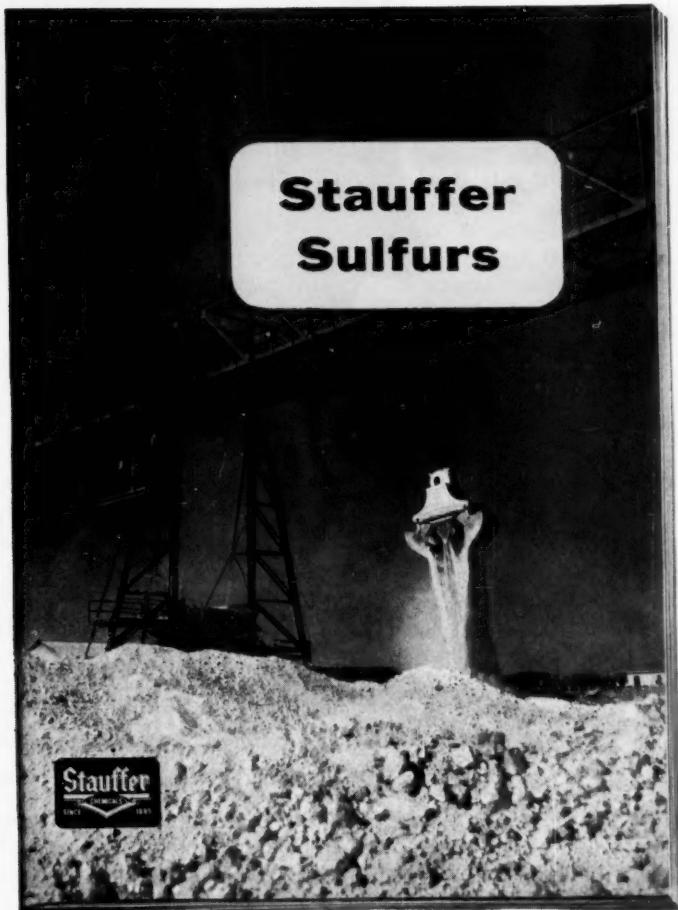
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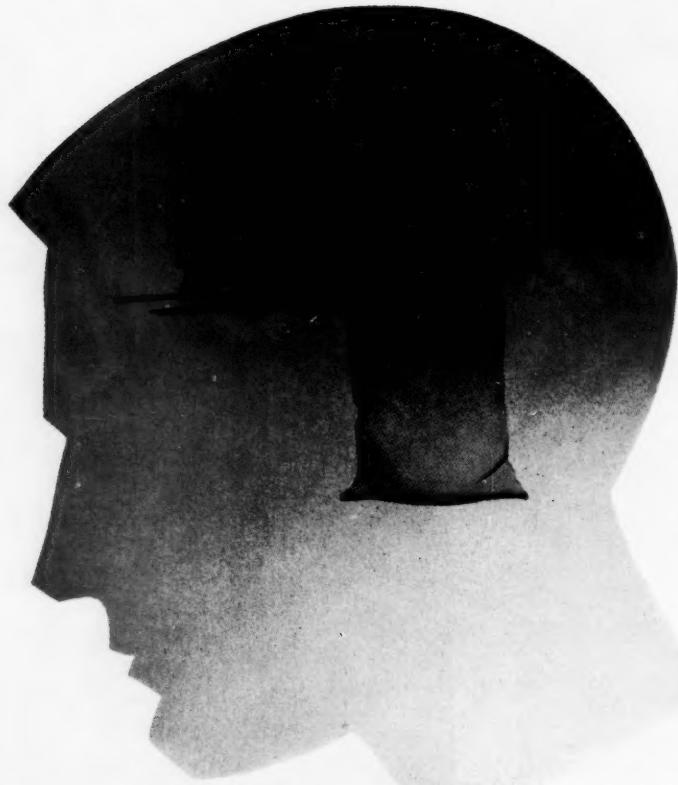
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OPINION

'Operating in a Vacuum'

TO THE EDITOR: I have been reading your article (*CW*, Aug. 3, p. 46) on the Harvard University Graduate School of Business Administration report on increasing the productivity of engineers.

The six suggestions summarizing the report are all excellent and pointed, but I cannot but note the absence of one important item in increasing productivity, that which involves an improvement in the manner in which the results of scientific and engineering research are brought to the attention of the engineers. This one item is so important that even though the other six were operating at 100% efficiency, the workers would be operating in a vacuum and would then really make but few improvements.

I find it a little amazing that an institution like Harvard University . . . would fail to be aware of such an important item in boosting productivity.

J. O. JONES
Acting Head
Office of Scientific Information
National Science Foundation
Washington, D. C.

Carbide, Not Chloride

TO THE EDITOR: My attention has been drawn by our Alkali Division to an article in an issue of *CHEMICAL WEEK* dated June 29. On page 80 of this issue you mention, in a table, that calcium chloride was imported to the tune of £2,439,516 in 1955 and £1,985,622 in 1956.

During the two years mentioned, the imports of calcium chloride were com-

paratively small, and the value was probably not in excess of £60,000 a year. I think the product to which you refer is probably calcium carbide.

I thought it as well to let you know that this point had been questioned and to send on to you the suggested explanation put forward by our Alkali Division.

J. T. THURLBY
Press Section
Imperial Chemical Industries Ltd.
Millbank, London

Reader Thurlby's Alkali Division is correct in its assumption that the chemical referred to as chloride should have been listed as carbide; values reported for 1955 and 1956 are for calcium carbide.

The erroneous substitution falls into the category of inexplicable occurrences. Several other readers have since called our attention to the matter.—ED.

Productivity vs. Wages

TO THE EDITOR: Mr. Carrier's letter and graphs (*CW*, Aug. 10) relating productivity and wages in the chemical industry are very interesting addenda to your article "Link Wages to Productivity" (June 22).

Certainly in the economy as a whole, this kind of relationship is most significant; and statistics are widely quoted to the effect that wages are increasing 4% annually, labor productivity only 2%, thus providing a built-in inflation factor in our economy.

Considering any given segment of the economy, we feel it misleading to draw firm conclusions from such a simplified relationship, since it neglects one of the two operative economic interests, that of the stockholder, and only considers the shifting position of the wage earner, and then only in relation to the chemical industry.

Increased productivity in the chemical industry is by no means due exclusively to increased efficiency of labor. It results most importantly from capital expenditures for installation of new facilities and equipment and the increased capacities and efficiencies that accrue as a result.

Ownership is primarily interested in

the profitability of the newly invested dollars. To obtain equity in the conflicting wage earner and ownership interests, one must establish a favorable relationship of net return on investment and simultaneously a favorable relationship of wages to cost of living.

I should be extremely interested to see Mr. Carrier's approach to this, which I feel is the decisive economic problem of our generation. Of course, we all have a special interest in the chemical industry, and it should be most valuable to also fit our own industry data into the broader economic perspective.

J. G. PENNIMAN
Manager, Emulsion Division
Reichhold Chemicals Inc.
White Plains, N. Y.

MEETINGS

National Agricultural Chemicals Assn., 24th annual meeting; theme: relations of marketing problems to progress in the agricultural chemical industry; The Essex and Sussex, Spring Lake, N.J., Sept. 4-6.

Instrument Society of America, 12th annual instrument automation conference and exhibit, Auditorium, Cleveland, Sept. 9-13.

Society of Photographic Scientists and Engineers, conference, Berkeley-Carteret Hotel, Asbury Park, N.J., Sept. 9-13.

American Chemical Society, 132nd national meeting, New York, Sept. 10-12.

Technical Assn. of the Pulp and Paper Industry, testing conference, Hotel Shoreham, Washington, Sept. 11-13.

Chemical Market Research Assn., annual resort meeting; theme: impact of St. Lawrence Seaway on chemical industry; Lake Placid Club, Lake Placid, N.Y., Sept. 15-17.

Canadian Agricultural Chemicals Assn., 5th annual meeting; theme: safety and health; Mont Tremblant Lodge, Que., Can., Sept. 15-18.

International Union of Leather Chemists Societies, 5th conference, Rome, Italy, Sept. 15-20.

National Bureau of Standards, free-radicals symposium, Washington, Sept. 18-20.



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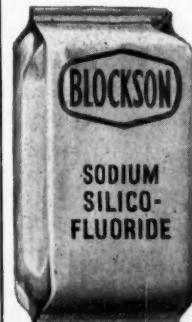
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LUMMUS BUILDING THREE SHELL PROCESS ETHYLENE OXIDE PLANTS

**Two plants in U. S., one in England will be world's first
to use Shell Development Co.'s direct oxidation process**

Within the next year three new plants for making ethylene oxide by the Shell Process will come on stream. All three are being designed, engineered and built by Lummus through whom the process is available. When completed they will be the first commercial scale plants to use the process developed by Shell Development Company.

In the Shell Process for making ethylene oxide, ethylene is reacted with oxygen over a silver catalyst in a fixed bed reactor. The Shell innovations, which have been thoroughly tested in pilot plants, offer several noteworthy advantages. Among these are high yields, and virtual elimination of the waste disposal problems encountered in the chlorohydrin process.

One of the new facilities is being built for Wyandotte Chemicals Corp. at Geismar, La., near Baton

Rouge. Annual capacity will be 60,000,000 lbs. of high purity ethylene oxide, most of which will be converted to ethylene glycol by thermal hydration for industrial and antifreeze uses.

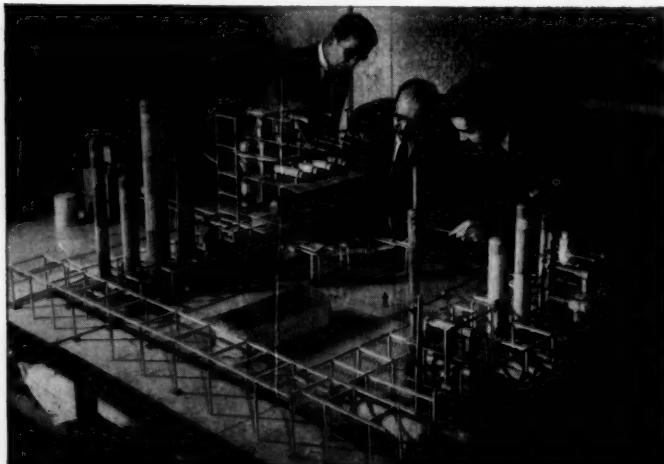
Lummus is building another 60,000,000 lb./year plant for Calcasieu Chemical Corp. at Lake Charles, La. Like Wyandotte's, it will have an ethylene glycol section.

The third plant, also a 60,000,000 lb./year unit, is being built at Partington, England for Petrochemicals, Ltd., one of the Royal Dutch Shell group companies.

All three plants use oxygen, which requires less capital investment than the use of air.

Lummus is proud to be entrusted by Shell and these producers with the task of putting the Shell Process into full scale application. The experience of the Lummus organization — in plant design, engineering and construction — will merit your confidence too.

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Lummus engineer points out on model, details of Wyandotte Chemicals' new ethylene oxide plant. Due onstream early in 1958, it will be first in U. S. to employ Shell Process

Business Newsletter

CHEMICAL WEEK
August 31, 1957

Steadily mounting sales of chemicals are apparent in the U.S. Dept. of Commerce's just-released survey figures. Chemical manufacturers' sales for the first six months of '57 climbed to \$12.0 billion, compared with \$11.4 billion in '56, and \$10.8 billion in '55.

Tax write-off for Allied Chemical's uranium hexafluoride plant was granted the firm last week by the Office of Defense Mobilization. Allied's facility, now under construction at Metropolis, Ill., is valued at \$11.4 million, of which 80% is eligible for the rapid tax amortization. Allied will make the gaseous fluoride for the Atomic Energy Commission.

Liquid Carbonic Corp. will enter the fold of General Dynamics Corp., according to a plan voted last week by the boards of directors of both companies. Stockholders will be able to vote on the share-for-share stock exchange proposal Sept. 27. Under the plan, Liquid Carbonic would become Liquid Carbonic Division, with no change in management.

Pharmaceuticals Inc. (Newark, N.J.) bought J. B. Williams Co. (Glastonbury, Conn.) last week for an undisclosed sum. Pharmaceuticals, maker and distributor of over-the-counter drugs such as Geritol, Serutan and Sominex, branched into cosmetic preparations with the move; Williams produces such toiletries as shave creams (Williams), after-shave lotions (Aqua Velva), and shampoo (Conti).

That controversial water fluoridation case has been settled. And it looks now as though Oroville, Calif., will soon have fluoridated water. The state supreme court has refused to interfere with the state public utilities commission ruling ordering a private water company to add fluorides to the water it supplies to the town of Oroville (*CW Business Newsletter*, April 27). Two groups of citizens sought to have the ruling voided, one on religious grounds, the other because the move allegedly violated citizens' rights.

The opening of the St. Lawrence seaway will have limited immediate impact on Canada's chemical industry, authoritative sources told *CW* last week. Geography's the primary limiting factor: with 89% of Canada's chemical industry concentrated in the provinces of Quebec and Ontario, where some sea transportation is already available (and where Canada's main markets are), the Seaway will provide few advantages.

There is, of course, the possibility that future developments can alter the picture. The exploitation of the mineral-rich Western Provinces, and the development of the petrochemical industry in the oil- and gas-rich province of Alberta could increase the role of the Seaway as a factor

Business

Newsletter

(Continued)

in the chemical industry. But says one authority: "Neither petrochemical products, nor uranium or any other minerals will go by the Seaway unless there is something new in lower transportation rates, faster service, or new and better markets."

And in the words of another Canadian chemical industrialist, "It is not to be expected that the relative importance of Quebec and Ontario will materially diminish in the foreseeable future."

Also limiting the effect of the Seaway is the fact that most (85%) of Canada's imports come from the U. S., where the Seaway provides few advantages. And U. S. takes about 70% of the exported Canadian chemical output.

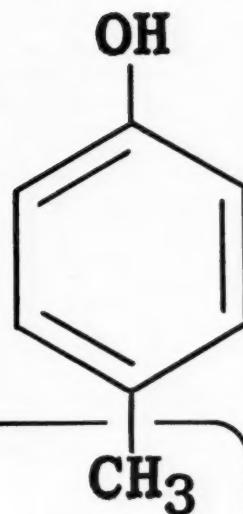
Canada's first linear polyethylene plant will be built near Sarnia, Ont., by Du Pont of Canada. Still in the design phase, the new plant will make use of technology Du Pont as evolved during the operation of the semi-works linear poly plant it has had operating in the U. S. for the past year. Du Pont already makes conventional polyethylene in Canada.

A new move to prevent the building of an atomic power plant by Power Reactor Development Corp. is in the offing. The city council of Windsor, Ontario, will ask the Canadian Government to intervene with the U. S. Government to delay the construction of the plant, because it may be hazardous, and prevailing winds may bring dangerously radioactive material to Windsor. The city council made its decision after George Burt, United Auto Workers' Canadian director, brought the matter to its attention. Burt also said the cities of Detroit and Toledo, as well as Amherstburg, Canada, were in potential danger.

Glass-like clarity in polyethylene is the promise of a new development by Bradley Container Corp., subsidiary of American Can Co. The clarity is achieved by coating natural polyethylene with a product called Barrier Gloss. Bradley won't name the chemicals used in its coating, which is said to reduce the permeation of essential oils, and of oxygen through container walls.

The number of "chemical words" in the average American's lexicon seems to be increasing only slowly. A recent study by Gallup and Robinson, opinion researchers, shows that as many as 61% U. S. citizens recognize the word, "vinyl," and 53% can name at least one product made of it. "Acrylic" and "alkyd" haven't fared quite as well—only 18% of adults checked admitted to ever hearing the terms, and fewer still could mention products or characteristics. The broad term, "latex," however, drew familiar nods from 70%.

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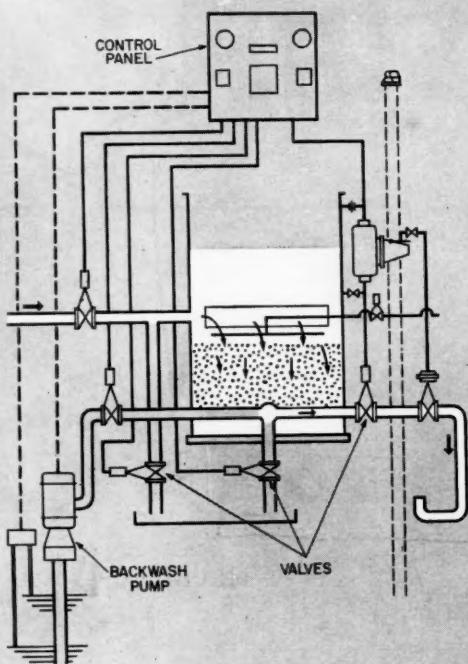
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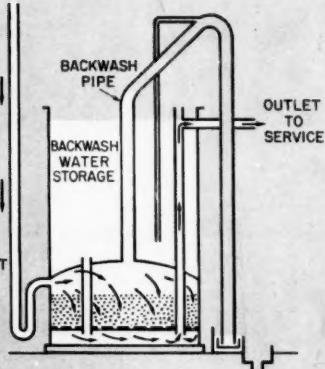
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The simplified design makes ingenious use of the siphon and other hydraulic principles to replace expensive valves, flow controllers, pumps and hydraulic or pneumatic control systems. The design also prevents wasteful, excessive use of water for backwashing or rins-

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The Valveless Filter produces uniform, high-quality water. It cannot be "forced." Backwashing or rinsing cannot be too little or too late . . . or accidentally run to Service. And the filter cannot develop common troubles like "cracked" or "upset" beds, "channeling" or "mudballs."

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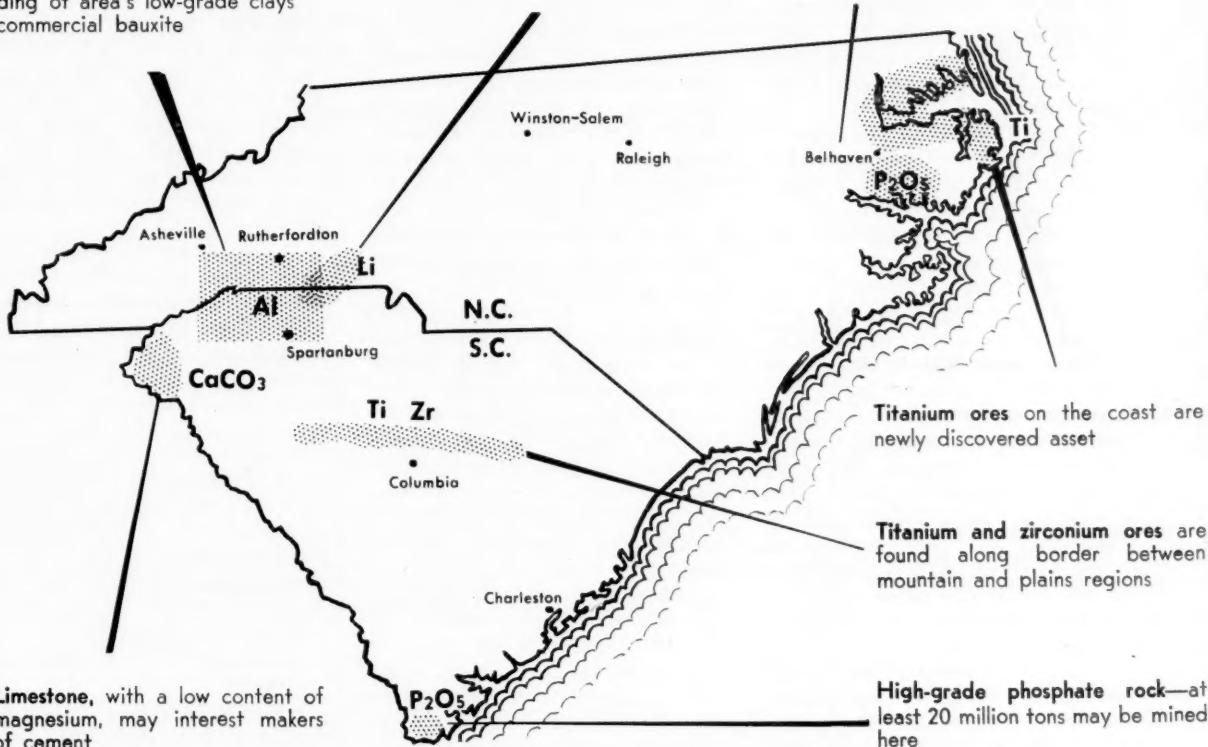
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Aluminum has the big metals companies scrambling for options here; new processes permit upgrading of area's low-grade clays to commercial bauxite

Lithium—about 80% of U.S. deposits are here

Deep-lying phosphate deposits are being actively investigated by large companies



Limestone, with a low content of magnesium, may interest makers of cement

Mineral Bonanza Brewing in Carolinas?

This week, Aluminum Co. of America becomes the newest of a group of process firms trooping South to seek minerals from the sandhills of the Carolinas.

Alcoa, until now silent on the subject, tells *CW* it's affiliated with Piedmont Properties Inc., a small land-buying firm that's quietly optioned 26,000 acres in the Spartanburg-Rutherfordton area (see map). The land reportedly has deposits of red and white alumina clays that might be upgraded to a commercial bauxite. The moves herald a new industry for the area, local observers say, although Alcoa says no plans for a plant have been settled.

And, last fortnight, Kaiser Alumi-

num confirmed a similar connection with Palmetto Lands Co. Palmetto, much the same as Piedmont, has acquired new lands in the region, paying premium prices for land (up to \$200/acre), sampling and analyzing clays for Kaiser.

Process Is the Key: Most analyses show the clays contain 16-17% alumina, according to state geologists. Until now, this hasn't been considered a commercial-ore content. But a new process for extracting relatively low-grade domestic clays, developed by Anaconda Aluminum in the Pacific Northwest (*CW Technology Newsletter*, Oct. 13, '56), has upped the chances of using deposits such as those in the Carolinas.

Only since the development of this potentially feasible process, have Kaiser and Alcoa, through their representatives in the area (Thomas Evins, vice-president of Piedmont, for Alcoa; and the staffers of Palmetto Lands, for Kaiser), been buying up clay-containing lands in the border region.

But Alcoa and Kaiser officials emphasize that their firms have no plans for building new plants there, that there are several weighty problems to be solved before they could even consider building.

Problems: No one concerned would elaborate further on what these problems are. One guess: clay that Anaconda processed at its pilot plant

in Anaconda, Mont., contained 20-40% alumina—considerably higher than the Carolina clays. And whether the process would work on the lower-content Carolina material is another question, one that Kaiser and Alcoa researchers must answer.

A second problem concerns the types of clay available in the Carolinas. Red clays, which contain iron and are somewhat more complicated to handle, are in abundant supply; the more readily processed white clays have not yet been located in the desired quantity.

If tests do prove the process satisfactory and if a good economical route for upgrading the clays is found, the Carolinas could get the biggest new industrial development in its history. Already, nearby towns are buzzing with reports—unconfirmed by the big aluminum firms—that two \$40-million plants are under consideration.

Power on the Way: While these reports are still in rumor stage, it is apparent that the Carolinas are getting set for more industrial development. Four power companies there have formed the Carolina-Virginia Nuclear Power Associates to build a large nuclear power plant somewhere in the area. Reported location: somewhere in the alumina clay region—near any big power-consuming aluminum plants that might be built.

Companies forming the nuclear unit are Carolina Power (Raleigh), Duke Power Co. (Charlotte), South Carolina Electric & Gas Co. (Columbia), and Virginia Electric Power Co. (Richmond). Last week, the four firms met to decide on the type of reactor they'll use. Though a decision was reached, details won't be forthcoming until AEC approves. The plant is slated to be completed in June '62.

More to Come: But aluminum processing isn't the only big power-using industry that may be on tap for the Carolinas.

In northeastern Carolina, deep-lying phosphate deposits are being investigated by Monsanto, International Minerals & Chemical and the General Crude Oil Co., a subsidiary of Sun Oil Co. of Pennsylvania.

However, Bear Creek Mining Co., a subsidiary of Kennecott Copper, has leased from the state mining rights on 60,000 acres of submerged lands in the Beaufort-Hyde County region. Says Kennecott, "We're definitely

interested," and "studies are now under way" toward development of the lands. Kennecott reports that phosphates there, which are buried under strata ranging in thickness from 45 to 250 ft., contain 8-31% P_2O_5 .

Similar deposits are being explored in the southern tip of South Carolina by Beaufort Mining & Development Co. (CW, May 25, p. 26). Others are reportedly looking there, too.

Titanium has been discovered in the sands along the north central coast of North Carolina; titanium and zirconium ores have been found in central South Carolina. Both discoveries are being checked by several interested firms.

In addition, approximately 80% of all U.S. lithium deposits are located adjacent to the west central Carolina border region. Foote Mineral Co. and Lithium Corp. have been operating plants here for some years. Though no one is saying anything, it's thought that these companies may be thinking of diversifying into alumina production, since the alumina clay region is nearby. In fact, a Lithium Corp. official, queried earlier this year (CW, Feb. 2, p. 24), said his company was "definitely investigating the possibility."

And, a study on low-magnesium content limestone discovered in the extreme northwestern tip of South Carolina is now in its initial stages. State geologist Henry Johnson tells CW that if surveys now under way prove substantial deposits, cement firms may be interested in locating there.

Congress Adjourns:

As Washington lawmakers packed their bags last week to head home for traditional fence-mending exercises, they left a "disappointing" record. The table (right) gives the picture of how chemical legislation fared in the just-ending session.

Investigation—rather than legislation—is the hallmark of the now-closing first session of the Democratic-led 85th Congress. And, barring the possibility of Republican control of the Senate's committees (CW, Aug. 24, p. 26), there will be more of the same when Congress reconvenes next January.

There will be some effort to improve on what President Eisenhower calls the "disappointing" legislative record of the past eight months. The election-year Congress that meets next will be faced with some hard-to-dodge issues of significance to chemical businessmen. Among major ones:

- Extension of the Reciprocal Trade Agreements Act, expiring next June 30, which is likely to unleash a no-holds-barred battle over U.S. foreign trade policy.

- Assistance to lead and zinc miners

- Aid to depressed areas.

- The role of the businessman in government.

- Export control authority—also expiring June 30. The debate on renewal might open a Pandora's box of conflicts over restricting trade with Communist countries.

- Regulation of chemicals used in foods and cosmetics.

- The biennial election year question of whether the budget can stand a cut in the income tax, personal and/or corporate.

Investigations: But, the investigations that got rolling over the past few months—plus a few yet to get started—will continue to hold the limelight and headlines. Nearly all these probes are aimed—directly or indirectly—at business, usually big business.

And from the file of old stand-bys, two dependable issues—liberalization of Social Security benefits, and the minimum wage, which both eventually show up as added costs to employers—are almost sure to gain more adherents in an election year.



Piedmont's Evins: His firm's buying.

Here's How Chemical Laws Fared This Session

Antidumping

House Ways & Means Committee held hearings on Treasury Dept. proposals to tighten enforcement of antidumping law, but put off action. Outlook: Treasury will be asked to revise proposals—then the Ways & Means Committee will turn the matter over to a subcommittee for further study.

Organization for Trade Cooperation (OTC)

Nothing this session; Administration expected to press for approval of U. S. participation next year.

Excise Taxes

House passed a bill to simplify and modernize administration of industrial alcohol taxes. Supported by the chemical industry, bill is before Senate Finance Committee.

Corporation Taxes

President signed one-year extension without rate changes.

Lead-Zinc Tariff

Senate Finance Committee approved Administration's proposed sliding-scale import excise tax bill, but House Ways & Means Committee won't go along. Outlook: no action this year—but good chance that subject will be renewed next session as part of effort to write import quota legislation.

Agriculture

Soil bank payments authority continued; more funds provided for federal research programs to expand industrial uses of surplus crops.

Plant Disposals

Congress okayed shutdown of Navy plants—now proceeding; approved sale of Akron research labs. But, House-approved Administration bill to allow sale of Louisville alcohol-butadiene plant for conversion to chemical manufacture was pigeonholed—after hearings in March—by Senate Finance Committee. Outlook: Senate Finance Committee will take up the bill next year, along with alternate plan (Curtis-Douglas bill) to reactivate Louisville as a government-owned butadiene producer drawing on the government's Omaha alcohol plant, the latter operating on surplus government-owned grains. Unless Congress acts, the Louisville plant will be turned over to General Services Administration in April '58, for disposal under terms set by GSA.

Food and Drug Amendments

House Interstate Commerce Committee held hearings on bills by Administration, industry and others proposing that manufacturers be required to pretest chemical additives used in foods, and calling for general tightening of federal control over such chemicals. Action likely next session. Other bills: an industry proposal, supported in principle by FDA, to allow more flexible control over food, drug and cosmetic coloring agents (synthetic or natural), and a bill to require pretesting of cosmetic additives. Neither bill saw action of any kind this session. Congress approved a bill easing rules on re-export of adulterated or mislabeled imported foods, drugs and cosmetics.

Narcotics Control

House Ways & Means Committee approved compromise bill to tighten federal control of synthetic narcotics production; enactment expected next year.

Tax Amortization

Congress enacted bill ending rapid tax write-offs Dec. 31, '59, and rigidly limiting them to Defense Dept. and Atomic Energy Commission contractors in the interim.

Alien Property Return

House Interstate Commerce Committee held hearings on various bills, but put off action until next year, when the White House is due to submit a new proposal. Major property involved is government-held General Aniline & Film Corp.

Atomic Energy

Congress authorized \$352,145,000 government construction program, including \$98 million for five-power reactor plants. Also, Congress approved U. S. membership in International Atomic Energy Agency, and enacted law providing \$500 million of government liability insurance to underwrite private atomic power plants.

Pollution Control

Congress increased funds for research, training in air pollution control, and provided more money to assist state water pollution control agencies and conduct research. Also voted: a second annual installment of funds to provide \$500 million over 10 years in grants to municipalities for construction of sewage treatment works.

Saline Water Research

Congress refused 50% boost in funds previously authorized to step up search for economical methods of converting saline and brackish water into usable fresh water. Program continued at '56 level.

Antitrust

Hearings were held on premerger notification and "good faith" price discrimination bills, but Congress took no action. Congress voted additional funds to Federal Trade Commission for antimerger activity; received second annual report from Justice Dept. on competition in the synthetic rubber industry; and okayed a time extension to early next year for a report by FTC on competition among antibiotics producers.

Advertising Claims

House Government Operations Subcommittee held hearings criticizing "ad" promotions of diet aids, planned to extend inquiry into tranquilizers and possibly other drugs.

Natural Gas

House Interstate Commerce Committee approved Harris-Fulbright bill to remove independent natural gas producers from federal rate control. But, Congressional leaders put off floor action until next year.

Regulatory Agencies

The House voted \$250,000 for a wide-ranging committee probe of all quasi-judicial federal regulatory agencies including charges that they have become subject to undue influence by the industries they were set up to regulate.

Tennessee Valley Administration

Bill to permit TVA to finance expansion by issuing its own bonds was pigeonholed in the House Rules Committee after clearing the Senate and being reported to the House.

Scientific Personnel

House and Senate Civil Service committees failed to act on proposals to boost salaries of government scientists and engineers—including, among others, Patent Office examiners.

Patent Office

Senate committees have yet to schedule hearings on bills to separate the Patent Office from the Dept. of Commerce; to set a 20-year limit from filing date on the life of patent; and, to reduce volume of "defensive patenting" by establishing a publication procedure without requiring patent application.



Cyanamid's Towe and Malcolm: Herald new rash of promotions.

Top Jobs Change Swiftly

The annual flutter of top executive changes got started last week with a rash of promotions—a good number of them to newly created posts. Firms making the changes included American Cyanamid, Procter & Gamble, Dow Chemical and Diamond Alkali.

At American Cyanamid, Kenneth Towe, president since 1952, was elected board chairman, a new post at the company. As chairman, Towe will continue to exercise an active hand in company management, at least, until his retirement from the company, due in '58.

Replacing Towe at the Cyanamid helm is Wilbur Malcolm, 55-year-old marketing vice-president.

Towe began as an accountant, whereas Malcolm is a research-oriented executive whose work on antipneumococci serum resulted in a high-yield, fast production process for Cyanamid's Lederle division. Malcolm started with Lederle in 1934.

Besides Cyanamid's board chairmanship, other newly created posts included a director of corporate relations for Dow Chemical. Donald Williams, who's been Dow's vice-president and director of sales, will handle the position. So far, says Dow, scope and details of the job haven't been set up, except that it will be concerned with "all the company's relationships with other firms, customers and potential customers and suppliers."

And at Diamond Alkali, new posts went to A. H. Ingle, manufacturing vice-president, and James Hughes,

treasurer. Ingle will be senior vice-president, and Hughes will assume the title of vice-president-administration.

Ingle, who's been with Diamond 37 years, will help President John Sargent in the "interpretation, coordination and execution of long-term plans and policies." Chairman and chief executive officer Raymond Evans said that the purpose of Hughes' appointment was to bring all employees under one head.

Meantime, in Cincinnati, Procter & Gamble's board of directors elected Howard Morgens, 46 years old, a vice-president, to succeed Neil McElroy, as president of the firm. Morgens will take over at an indefinite time, depending on when McElroy leaves P&G to assume his new duties as Secretary of Defense.

Two-Way Patent Suits

Two-way patent suits between Syntex S. A., the American-owned Mexican steroid producer, Merck and Schering, cropped up in the courts last week.

In a suit, filed last Friday, Syntex charges that both Merck and Schering are infringing its U. S. patent covering "prednisone, prednisolone and steroid compounds of similar structure," seeks an accounting of profits and treble damages against the firms.

In another suit, filed the day before Syntex's, Schering asks that Syntex's patent be declared invalid and that Syntex's patent hasn't been infringed by Schering. Schering contends that the patent covers so many theoretical compounds—"a quintillion"—that the entire patent is invalid.

The suits were filed after negotiations between Syntex and the two companies over licensing arrangements were terminated last Wednesday—following years of talk. Negotiations covered both the issued patent—on work done by steroid researcher Carl Djerassi, who now works for Syntex—and patents now sought by Syntex, Schering, Merck, Upjohn, Ciba and Pfizer on the specific compound, prednisone. The basic issued patent is a broad one covering numerous related steroid structures.

Schering contends that the broad patent, if held valid, would tend to stifle research by other companies in the prednisone-related fields. Syntex says its patent is far less theoretical than that, is basic—with reasonable limits set by the patent's claims.

Surprises from Ford

While Ford Motor Co. was giving the public an eyeful of the flashy new Edsel (right) this week, it also was giving paintmakers something—albeit less spectacular—to evaluate. That is: a letter to paint suppliers, requesting formulations of nonflammable (water-based) primer paints. Ford's interest in nonflammable primers is the result, in part, at least, of an expensive fire this spring on one of its painting lines. The company has been working with water-thinned primers based on a new styrene-butadiene latex made by Dow (CW, Feb. 2, p. 66). But also offering promise as a base for water-



thinned metal primers is a polyvinyl acetate latex produced by Celanese (CW, May 25, p. 69).

EXPANSION

Sulfur: Stauffer Chemical's Consolidated Chemical Industries division will more than double the capacity of its sulfur recovery plant at Baytown, Tex. New installations, which will use as feedstocks sulfur-containing gases from Humble Oil's nearby refinery, should be ready by early '58.

Sodium Chlorate: Electric Reduction Co. of Canada Ltd. is planning a multimillion-dollar expansion of its sodium chlorate facilities at one or the other of its plants at Buckingham, Que., and Vancouver, B.C.—both of which are now producing sodium chlorate. The question of which plant will be expanded is still under consideration.

Tantalum: Kawecki Chemical Co. will add a new tantalum plant to its complex in Boyertown, Pa. (see also pp. 82-86). The new unit will boost tantalum capacity by 100%, is scheduled for completion in September.

Resins: Steen Resin & Chemical Co., division of United Wallpaper Co. Inc., is building a 25-million-lbs./year plant to make alkyd, vinyl copolymer and other industrial resins. United will use a large part of the output at its paint plants in Chicago, North Carolina and Pennsylvania. Completion is slated for April '58.

Tars: Reynolds Mining Co., a subsidiary of Reynolds Metals, has acquired options on lakeshore property in Wyoming containing large deposits of low-grade coal. Tests on tars extracted from the coal in the Lake DeSmet area have confirmed the presence of commercial quantities of materials for liquid fuels and chemicals.

Natural Gas: Anchor Gas Corp. is blueprinting a \$1.5-million natural gas cycling plant near Klotz Springs, Ala. The new installation will extract butane, propane and other liquefied petroleum gases from natural gas.

Oxygen: National Cylinder Gas Co. will double the capacity of its Chattanooga oxygen plant in a \$300,000 expansion.

COMPANIES

British Columbia Cement Co. Ltd. and Coleman, Evans & Gilly Brothers directors have approved plans to merge the two firms. The agreement calls for a new holding company, Ocean Cement and Supplies Ltd., to be formed. Both companies would retain their sepa-

rate identities. Ocean Cement will control all the stock of both firms.

Hagan Chemicals & Controls, Inc., plans to sell 30,000 newly issued shares of \$50-par convertible preferred stock through a public offering. Proceeds will be used for new construction and working capital.

National Distillers & Chemical Corp. will pay a 2% common stock dividend this October to shareholders of record Sept. 6. National Distillers' president, John Bierwirth, said the stock dividend policy, adopted last year, reflects improved earnings, while conserving cash for the company's expansion programs. Distillers' usual 25¢ quarterly dividend will be paid Sept. 3.

FOREIGN

Coal Tar/India: Foreign consultants are racing to complete coal-tar facilities at three Indian government steel plants. The British may win out at Durgapur (West Bengal), because the Russians (at Bhilai, Madhya Pradesh) and the West Germans (at Rourkela, Orissa) have run into trouble arranging for civil engineering construction. Products will range from benzene, toluene and xylene, to ammonia sulfate, various naphthas, light oils, and phenols. Annual coal requirements: Durgapur, 1.8 million tons; Rourkela, 1.6 million tons; Bhilai, 1.7 million tons.

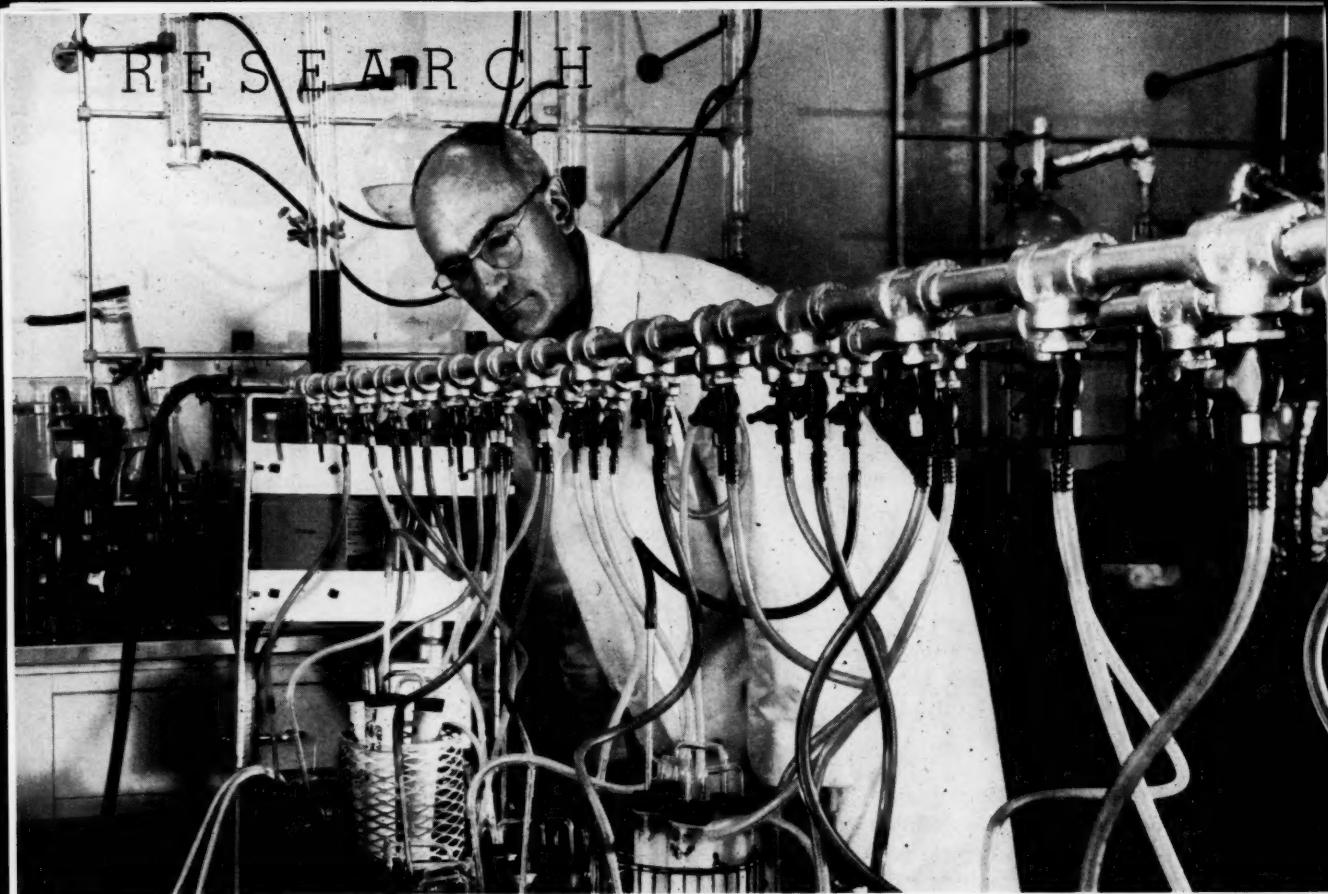
Petrochemicals/England: An \$8.4-million, 45-million-lbs./year ethylene oxide derivative plant will soon be constructed by Union Carbide Ltd., to go onstream by 1959. The plant, to be located at Fawley (near Southampton), will convert ethylene into ethylene oxide, ethylene glycols, polyethylene ethers, ethanolamines, glycol ethers, and specialized products.

In October, Union Carbide Ltd. will complete its 24-million-lbs./year polyethylene plant at Grangemouth, Scotland.

Nitrogen Products/Rhodesia: Allied Chemical and Dye Corp. has decided against building a nitrogenous-products plant in the Federation of Rhodesia and Nyasaland. Allied expects Rhodesia's 1960 fertilizer and explosives demand will be 27,000 short tons—not enough to warrant a plant.

Methanol/Germany: Union Rheinische Braunkohlen-Kraftstoff AG. (Wesseling-Cologne) will expand its methanol production to more than 150,000 tons per year, an increase of 35-40,000 tons. West Germany's total raw methanol output in 1956: 192,822 tons.

Union Rheinische is the only German firm using brown coal as a starting material. West Germany's largest deposits are near Cologne.



At Pfizer's agricultural research center, mechanical cow is used to study digestive processes.

Will Tranquillizers Find Use in Cattle Feed?

This week, the Food & Drug Administration is weighing an \$8-million question—whether or not to approve the use of tranquilizers in animal feed. An \$8-million/year market in tranquilizers is predicted by Chas. Pfizer & Co. (Brooklyn, N.Y.)—once FDA gives its o.k. And Pfizer, which has researched this application extensively, isn't guessing offhand.

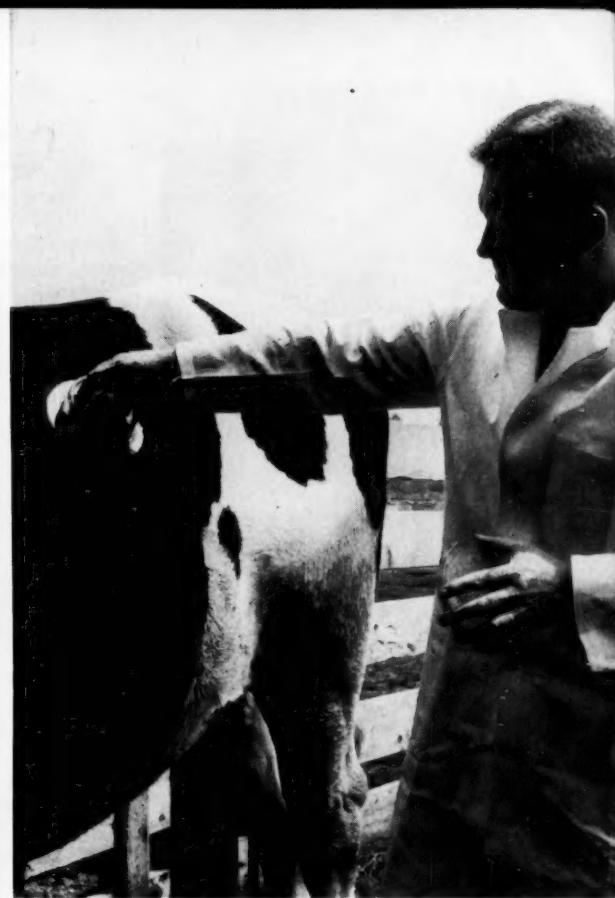
On its sprawling, 700-acre agricultural research center in Terre Haute, Ind., Pfizer has found that use of tranquilizing *rauwolfia* derivatives such as reserpine boosts the rate of steer weight gains an average of 12%. (Lambs gained weight a startling 28% faster than normal on a tranquilizer-containing diet.) The firm has recently begun antibiotic additive field tests on 9,000 head of cattle roaming 57 counties in Minnesota, South Dakota, Iowa and Nebraska; Pfizer hopes the test (its project 57) will soon be extended to include tests of tranquilizer-fortified feeds.

Of course, Pfizer isn't committed to *rauwolfia* drugs for the purpose. As manufacturer of the synthetic tranquilizer Atarax, it admittedly hopes synthetics will be just as good in feeds. But a lot more research remains to be done before the best material for this use can be determined.

Other drug firms are researching, too. Warner-Chilcott (Morris Plains, N.J.), maker of Paxital, reports it has been trying tranquilizers on cattle for about two years. Earlier, the firm reported the drugs prevented loss of appetite (and weight) in cattle during shipment (CW, Feb. 16, p. 84). Reserpine pioneer Ciba (Summit, N.J.) has tests under way. Though it is wary of telling many details, it does concede that side effects need more study. Wyeth (Philadelphia) confirms one Pfizer finding—animals fed tranquilizers eat more food in a given period of time, seem also to convert it into body tissue at a faster rate than usual. Wyeth is looking at both antihistamines and tranquilizers for the purpose, has no findings to report at present. American Cyanamid's Lederle Laboratories (Pearl River, N.Y.) also has a long-range research project on tranquilizers for cattle, is similarly tight-lipped about it.

Drug firms still on the sidelines in feed-tranquillizer research include Abbott Laboratories (Chicago), Eli Lilly (Indianapolis), and Pitman-Moore (Chicago). One likely reason: tranquilizers are still expensive, test costs may be prohibitive unless a firm is a basic producer.

Clearance Problems: Meanwhile, FDA clearance



For projects that require live-animal study, a combination of force-feeding and stomach-sampling is used.

Agricultural Research May Find the Answer

looms as an even bigger hurdle than costs. FDA has two major requirements for animal feed additives, both of which presumably will be applied to tranquilizers. First, the additive must not harm the animal; second, no drug residue whatever may appear in products made from the treated animal. The second requirement applies only to drugs added to feed to enhance the economic value of animals; it does not apply to therapeutic drugs. Drug firms are making time-consuming tests to prove that no residue exists, but since this policy is several years old, there is some hope it may be revised.

Pfizer, since getting into agricultural chemicals seven years ago, has bet heavily on other feed additives, too. It spent more than \$1 million for research last year at its Terre Haute farm alone. "As a result," Jerome Thompson, vice-president of Pfizer's agricultural division, tells *CW*, "we are confident that we are ahead of others in the feed-tranquilizer field, and we don't fear competition in other aspects of chemical feed-fortifying."

Thompson says he expects that if tranquilizer-forced feed gains FDA acceptance, the feed will possibly be in the farmers' bins next year. His firm will sup-

ply the tranquilizer to prepared-feed manufacturers; it will make no feed itself. The market, while large, isn't as sizable as an onlooker might guess. Thompson figures 2 lbs./day of feed is required for each steer. That totals to 5-6 million tons/year of manufactured feed. Because only a small percentage of tranquilizer is necessary in the feed to get the desired results, the potential market is restricted.

But other feed additives are still being researched, could swell the dollar total markedly. Herbert Luther, director of Pfizer's agricultural research, can point to one good reason for such optimism: the growth-stimulating effects of additives are superimposed, one on the other. In trials designed to determine the possible interaction of tranquilizers with antibiotics and diethylstilbestrol and a combination of them, Pfizer found that these materials are additive. Tranquilizers improved the rate of gain and feed efficiency over and above improvements resulting from use of any of these materials alone.

In an 84-day trial with steers, the use of Terramycin resulted in an 11% improvement in gain and a 9% improvement in feed efficiency. Use of stilbestrol gave a 17% increase in rate of gain and a 13% improvement



FRANK AMELIA

Pfizer's Thompson: In feeds, 'no competition.'

in feed efficiency. When a combination of Terramycin and stilbestrol was checked, a 23% boost in rate of gain and a 16% boost in feed efficiency were reported.

In all three cases, when a tranquilizer was added, a further 12% improvement in rate of gain and a 7% improvement in feed efficiency were reported. Note: there's a chance, Luther believes, that the chemical calmers may help quiet the animals before slaughter, thereby improve meat quality as well.

Stilbestrol and antibiotics, of course, are no novelty as cattle feed additives. About a year ago, farmers and feeders in Pfizer's project 57 test area started trials that involved feeding 9,000 animals Terramycin-fortified rations. Twenty-three commercial feed manufacturers cooperated in the program. These animals are moving to market and Pfizer says preliminary results point to significant improvements in rate of gain, feed efficiency and carcass quality.

(One unexpected dividend has been the low—less than 1% vs. a normal 10-30%—condemnation of beef livers at the slaughter house because of abscesses. At the packing-house level, livers are worth \$4.50-5.)

Even before antibiotics found feed use, stilbestrol was used to promote fast weight gains in animals. Hope of the additives researchers is that a lot

more progress can be made.

One expert points out that the U.S., despite its material riches, is still on "a hamburger standard of living." Feed additive makers are hoping to make the standard one of steaks.

PRODUCTS

Alkylation Entries: Fine Organics, Inc. (New York), now offers alkyl tosylates, alkyl esters of *p*-toluenesulfonic acids. Except for the lower members of the series (methyl, ethyl, propyl and butyl tosylates), the compounds are new on the commercial scene.

Alkyl tosylates, in general, permit introduction of an alkyl group into an organic molecule at substantially lower temperatures than those required by alkyl halides. Suggested use: in synthesizing temperature-sensitive pharmaceutical compounds.

New Standards: American Petroleum Institute standard samples of pyridine, pyrrole and pyrrolidine are now available from Carnegie Institute of Technology, Chemical and Petroleum Research Laboratory (Pittsburgh). Price: \$50/5 ml. Thirty-five standard organic sulfur compounds (e.g., alkanethiols, cycloalkanethiols) are also offered.

New Dyes: Ciba Co. Inc. (New York) offers a new line of dyes, trademarked Cibacron, that feature chemical rather than physical bonding to cellulose. The dyes contain reactive chlorine, which combines with the hydrogen atom in the hydroxyl group of a cellulosic fabric; they are reportedly wash-fast.

Anethole Available: Anethole is now commercially available in technical and U. S. P. grades from Glidden Co. (Cleveland). Of interest to flavor chemists and perfumers, the new grades are reportedly free from cisanethole, methyl chavicol, terpinol and other alcohols.

Polystyrene Hybrid: Union Carbide's Bakelite Division is out with a new rubber-modified polystyrene with medium impact strength. Designated TMDA-8020, the new polymer is suited for switch plates, etc., reportedly offers the chemical and electrical properties of high-impact

styrenes plus the molding properties of general-purpose styrene.

Ultrapure sulfite: Fisher Scientific Co.'s (Pittsburgh) new high-purity sodium sulfite is suggested for use in textiles, dyes, glass, paper and food processing applications requiring rigid purity control.

Stainless Insecticide Base: Improved pyrethrene concentrates combining pyrethrins and piperonyl butoxide are ingredients of a new nonstaining, low-toxicity insecticide base offered by Food Machinery and Chemical Corp. (New York).

Cobalt-60 Bargain: Price reductions of 50-70% on cobalt-60 radiation sources have been made by the Nuclear Systems Division of The Budd Co. (Philadelphia).

Super Rayon: A new superstrong tire rayon yarn, introduced by American Enka Corp. (Enka, N. C.), is said to be superior to nylon in rupture resistance.

EXPANSION

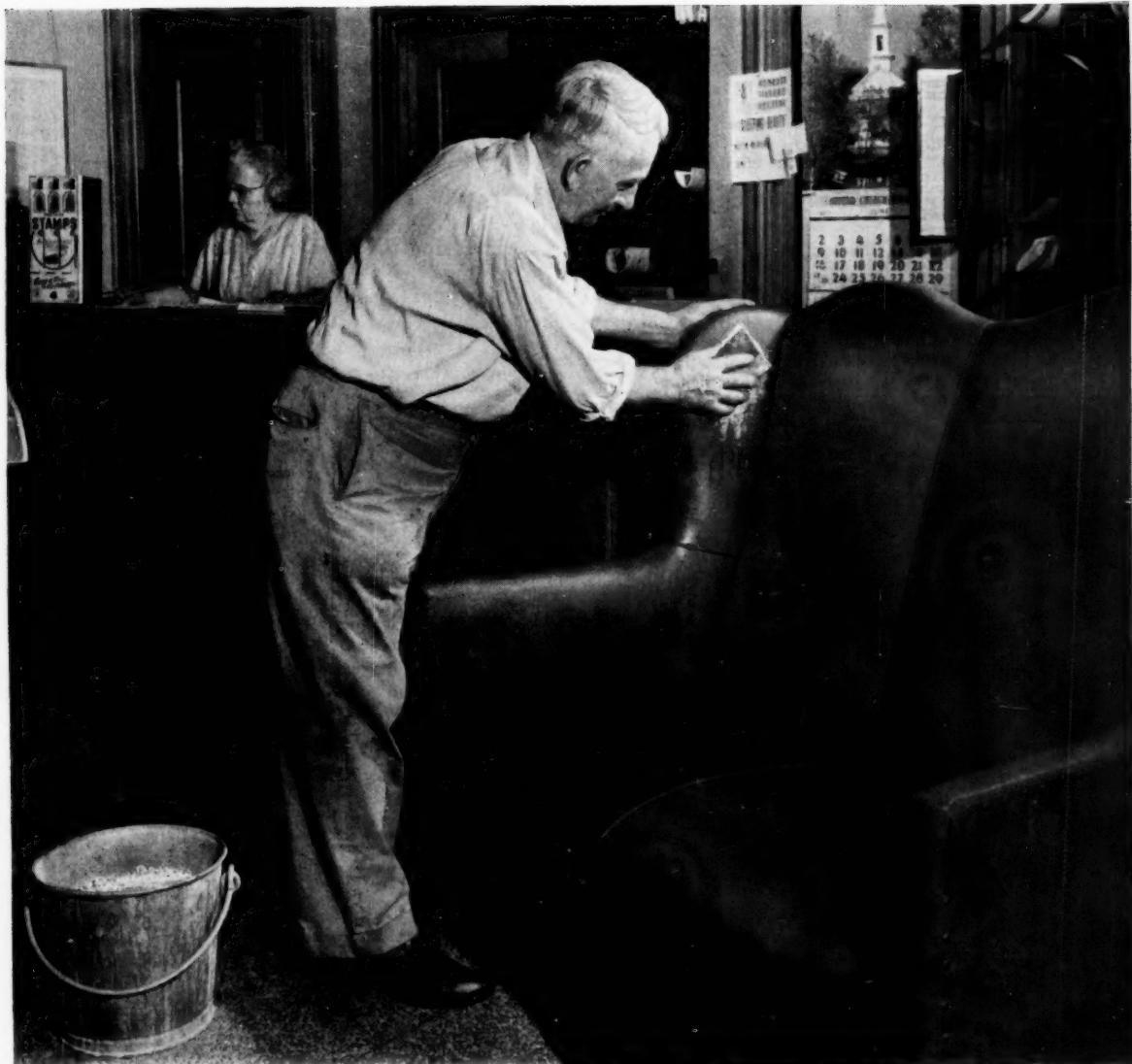
• Procter & Gamble (Cincinnati, O.) will start construction this month of a new technical center in northern Cincinnati. It will include a product research and development building, is scheduled for completion by mid-1959.

REPORTS

These reports are available from The Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D. C.:

• "Development of a Micro Method for the Determination of Aliphatic Aldehydes" (PB121996, \$1, 33 pages) explains a colorimetric method using 2-(*p*-phenylazo)-phenyldiazine sulfonic acid as a reagent for development of a color that is proportional to the amount of aldehyde. This method can be used to measure 0.5 ppm. of aldehyde in air, with a measurement accuracy of 0.5 ppm. Aliphatic aldehydes are produced during the degradation of synthetic lubricating oils. Their toxicity and hazardousness to flight crews prompted this research.

• Elimination of supplementary mechanical tests required by ASTM



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is the keynote of "One Method of Measuring the Solvent Resistance of Crystal-to-Crystal Adhesive Bonds" (PB 121582, Nov. '56, 50¢). The test described can also determine the optimum conditions for preparation and cure of adhesives.

• "A Review of the Air Force Materials Research and Development Program" (PB 111648, S2, \$2.50) contains abstracts of 145 research reports (July 1, '55 through June 30, '56) in adhesives, metallurgy, analysis and measurement, biochemistry, textiles, petroleum products, plastics, packaging and protective treatments of rubber.

• "Preparation and Properties of Titanium Tetrabromide" (PB 121542, \$1) covers the preparation of high-grade $TiBr_4$ by direct synthesis from high-purity materials, includes physical and thermodynamic property measurements.

• "Infrared: A Library of Congress Bibliography, Part II" (PB 121998, \$3) is a listing of references, unclassified reports and formerly restricted reports concerning the scientific aspects of infrared radiation, its effects and technical applications.

• "Oxidative Degradation of Polyethylene" (PB 121682, 75¢) deals with experiments on the degradation of the polymer in molecular oxygen, ozone-enriched oxygen and fuming nitric acid. Solid, liquid and vapor products were analyzed by their infrared spectra.

LITERATURE

• A new edition of the "Isotope Index—1957" offers 100 pages of listings of every known commercially available isotope, as of April 1, 1957. The book, available at \$3 from Scientific Equipment Co. (Indianapolis), categorically lists more than 3,000 isotopes from more than 50 U. S., Canadian, British, French and German suppliers, and includes information on activity, latest prices, half-life and principal radiation energies.

• "Analytical Flame Spectroscopy" is a 28-page recently compiled listing of available literature on that subject, containing more than 900 references from the year 1848 to the present. Indexed into field of application, the reprint (R-100) may be obtained from Beckman Instruments Inc. (Fullerton, Calif.). Price: 50¢.

Why "living" polymers are unique

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2. Molecular weight is controlled with extreme precision.
3. Polymerization side reactions and impurities are greatly reduced.
4. Unusual, custom-built block copolymers are possible.

Polymers Sport 'Live Ends'

Tomorrow's polymers, many top researchers believe, will probably be more unusual structurally than chemically. As a result, researchers are looking not only for new monomers but also for better ways to link currently known monomers. Behind this outlook is the success of low-pressure polyethylene and some other comparatively recent polymers that are made from old raw materials by new techniques.

This week, chemical companies are taking a hard look at a new method to make unusual polymers from usual monomers. Dow and Monsanto, for example, admit to an active interest in the basic research on "living" polymers under way at the College of Forestry, State University of New York (Syracuse) under research professor Michael Szwarc. Where all polymerization is initiated, propagated, then terminated—and ordinary polymerization proceeds swiftly through these three stages—polymerizations by Szwarc and his associates do not. Instead, the polymer is kept "alive" during the propagation step, can be "fed" monomer (either the same or a different one than the starting material) at will. When the desired polymer is achieved, Szwarc terminates, or "kills," the polymer, stopping the polymerization permanently.

The principle Szwarc uses is that normal polymerization is terminated by a proton donor such as oxygen or water in the polymerization system. So in "living" polymer systems, air and moisture are excluded until termination is desired.

Working with styrene, isoprene and butadiene, Szwarc has achieved polymers that feature the unusual properties (*above*). He contemplates further research using α -methyl styrene in a nitrogen atmosphere. Although his work is fundamental in nature, Szwarc tells *CW* it has "commercial significance for the future."

Big reasons for this optimism are his findings that the new polymers feature consistent molecular structure, avoid the side reactions and impurities that are often characteristic of other polymerization methods. As a result, molecular weight can be precisely controlled. The molecular weights of ordinary polymers are usually an average of the molecular weights of several components. Not so with the new polymers. Szwarc reports he has made polystyrene having a ratio of theoretical molecular weight to actual molecular weight of 1.06 to 1.

Block polymers can also be made by the new technique. These include more than one constituent in prearranged amounts and in prearranged order in the molecular chain. Some have been made, at the Syracuse laboratory, from styrene and isoprene. This faculty of the method makes it a handy tool in polymer architecture research, could lead to unprecedented monomer combinations having unique properties.

While "living" polymers date back to observations on the phenomenon by N. D. Scott (patent 2,181,771 issued in 1939), their potential is just now being appreciated. How big it will be may well be determined by investigations now in progress.



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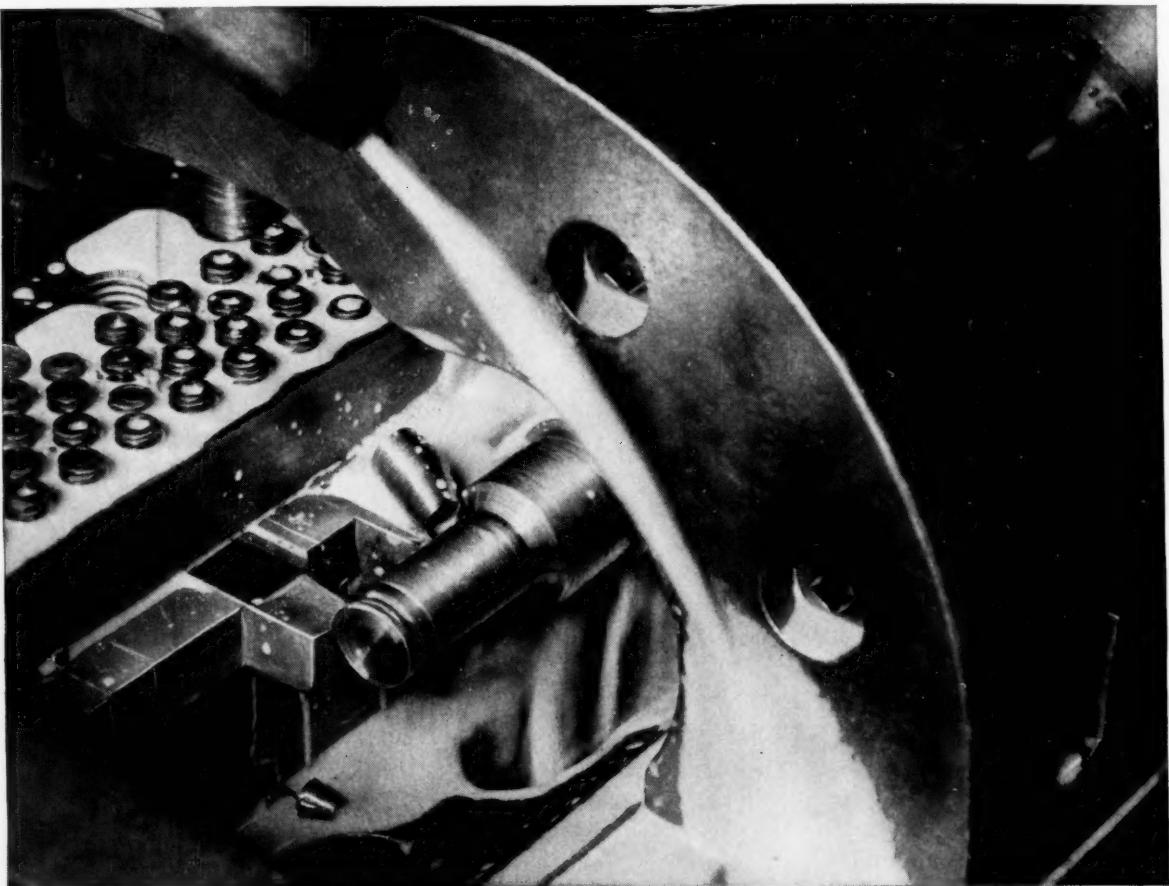


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Washington Newsletter

CHEMICAL WEEK

August 31, 1957

U.S. foreign trade and tariff policy is in for some real pulling and hauling when Congress reconvenes next January. Already, the battle lines are being drawn for a review of over-all effects of the Reciprocal Trade Agreements Act. Action on the measure—up for extension next year—will be one of the big issues of the session, as the White House, committed to a relatively low-tariff philosophy, again takes on protectionist members of Congress. On Capitol Hill, the free-traders, traditionally Democratic party members, will be led not only by Sen. Paul Douglas (D., Ill.) but also by Rep. Hale Boggs (D., La.).

This fall, Boggs, who heads a House Ways & Means Subcommittee, will conduct a forum under its auspices to build a record for the reciprocal policy. Economists, businessmen and trade specialists will sit in on round-table discussions—rather than hearings—to discuss every conceivable facet of tariffs, quotas and international agreements.

A bill to establish both import quotas and tariffs will also come up next session. Many commodities—including chemicals and minerals—would be covered by a general formula for fixing tariff rates on the basis of the ratio of imports to domestic consumption. Among the industries most interested in this proposal are certain domestic producers of fluorspar, not integrated with consuming industries, and producers of lead and zinc, textiles, plywood and packaged seafood items.

Settlement of disputes over patent rights of U.S. subsidiaries operating abroad has been put off for at least another year. The International Convention for the Protection of Industrial Property—scheduled for Lisbon this October—has been put off until Oct. 1958, at the insistence of some European countries, including West Germany and France.

Postponement came as a blow to hopes of U.S. chemical and drug executives and the State Department for action to correct a host of conflicting patent policies that have cropped up as trade barriers since the last such convention in 1934. U.S. firms and government delegates had been huddling for months to draft U.S. proposals for inclusion in the revised patent treaty due to be taken up at Lisbon. They will use the interim to refine U.S. positions, seeking allies among other signatories.

A major objective: protection against compulsory licensing of chemical and drug patents taken out by U.S. firms in foreign countries. Talk has centered around a five-year period of exclusive protection for the patent owner—before compulsory licensing rules apply. The U.S. now requires such licensing of a foreign national's patents within three years after filing, but Great Britain won't allow this—even to correct abusive patent use. Another U.S. aim: world-wide recognition of the right

Washington Newsletter

(Continued)

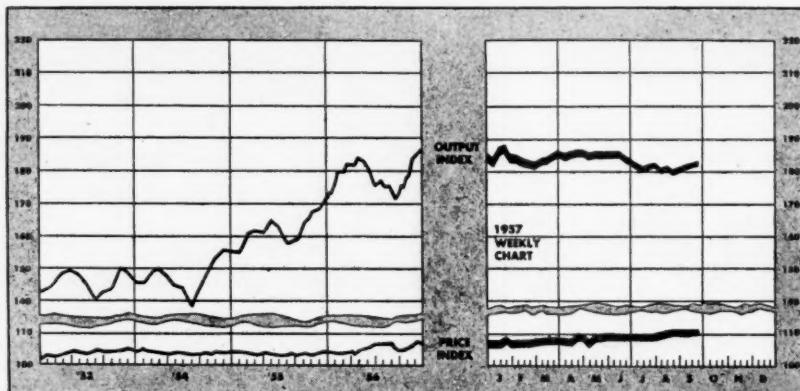
to patent drug products. Italy grants patents on drug manufacturing processes, but won't give patent protection to drug products, themselves.

Linde Air Products lost a fast tax write-off certificate for liquid oxygen and nitrogen because its expansion plans were so big. Had the application been granted, few other producers could have come in for any part of the goal.

That is the interpretation you get in Washington from the Office of Defense Mobilization. The Commerce Dept.'s Business and Defense Services Administration doesn't agree entirely; officials say some way could have been found to give Linde, the biggest producer, a go-ahead, while still leaving space for others.

ODM acted in turning down Linde after the Justice Dept. stepped in. Justice, unofficially, just feels that Linde is too big in the field already, so the lawyers took advantage of the size of Linde's application, and recommended a turndown.

Defense Mobilizer Gordon Gray signed tax write-off certificates last week, okaying participation in the 4-billion-cu.-ft./year expansion to meet military needs—for all qualified applicants except Linde. All were given permission to write-off 60% of plant costs in five years. The amount certified was \$17 million—spread over 16 plants adding 3,741,000,000 cu. ft./yr. to capacity.



Business Indicators

WEEKLY

Chemical Week output index (1947-49=100)
Chemical Week wholesale price index (1947=100)
Stock price index of 11 chemical companies (Standard & Poor's Corp.)

	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	181.5	182.0	173.5
Chemical Week wholesale price index (1947=100)	110.8	110.8	105.5
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	43.48	43.78	48.22

MONTHLY

Production (Index 1947-49=100)

All manufacturing and mining
All chemical products
Industrial chemicals

	Latest Month	Preceding Month	Year Ago
All manufacturing and mining	135	145	128
All chemical products	171	180	166
Industrial chemicals	192	202	182

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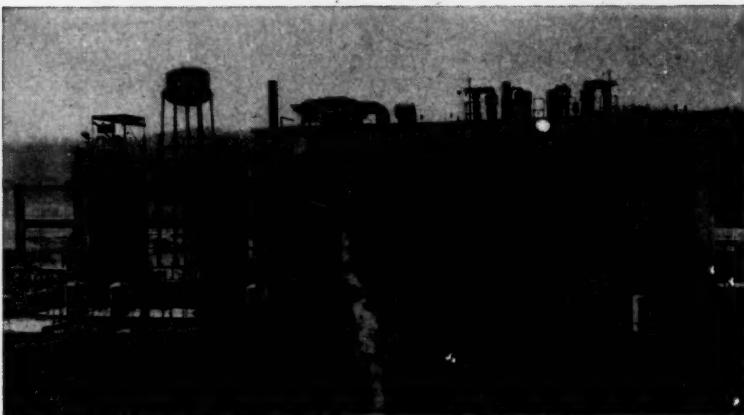
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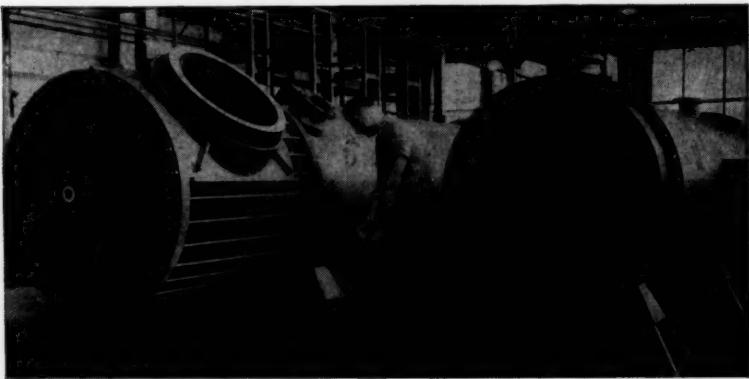
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ADMINISTRATION



Alcoa builds another rod mill, furthering process-plant expansion at Victoria, Tex.

New Gulf Coast Chemical Center Abuilding

Claiming a "fighting chance" to rival the Houston-Texas City area as a chemical industry center on the Texas Gulf Coast is the grassy lowland region lying seaward of Victoria (map, p. 56). So far, this cotton-, rice- and cattle-growing region has only three process industry plants to its name. But all three are whoppers and this week all are expanding:

- First came Aluminum Co. of America, which started building its aluminum-smelting plant at Point Comfort in 1949 and had it in operation by May '50.

Besides enlarging that smelter, the company has been constructing two new units at the same site: a \$45-million alumina plant and an absorption plant for natural gasoline.

- Du Pont located its adiponitrile plant near Victoria and made its first shipments in '51. That same year, work was started to increase plant capacity by 100%; and another expansion project is now under way.

- Union Carbide Chemicals Co. acquired its 1,550-acre plant site northwest of Seadrift in '52, and two years later began shipping polyethylene. Now under

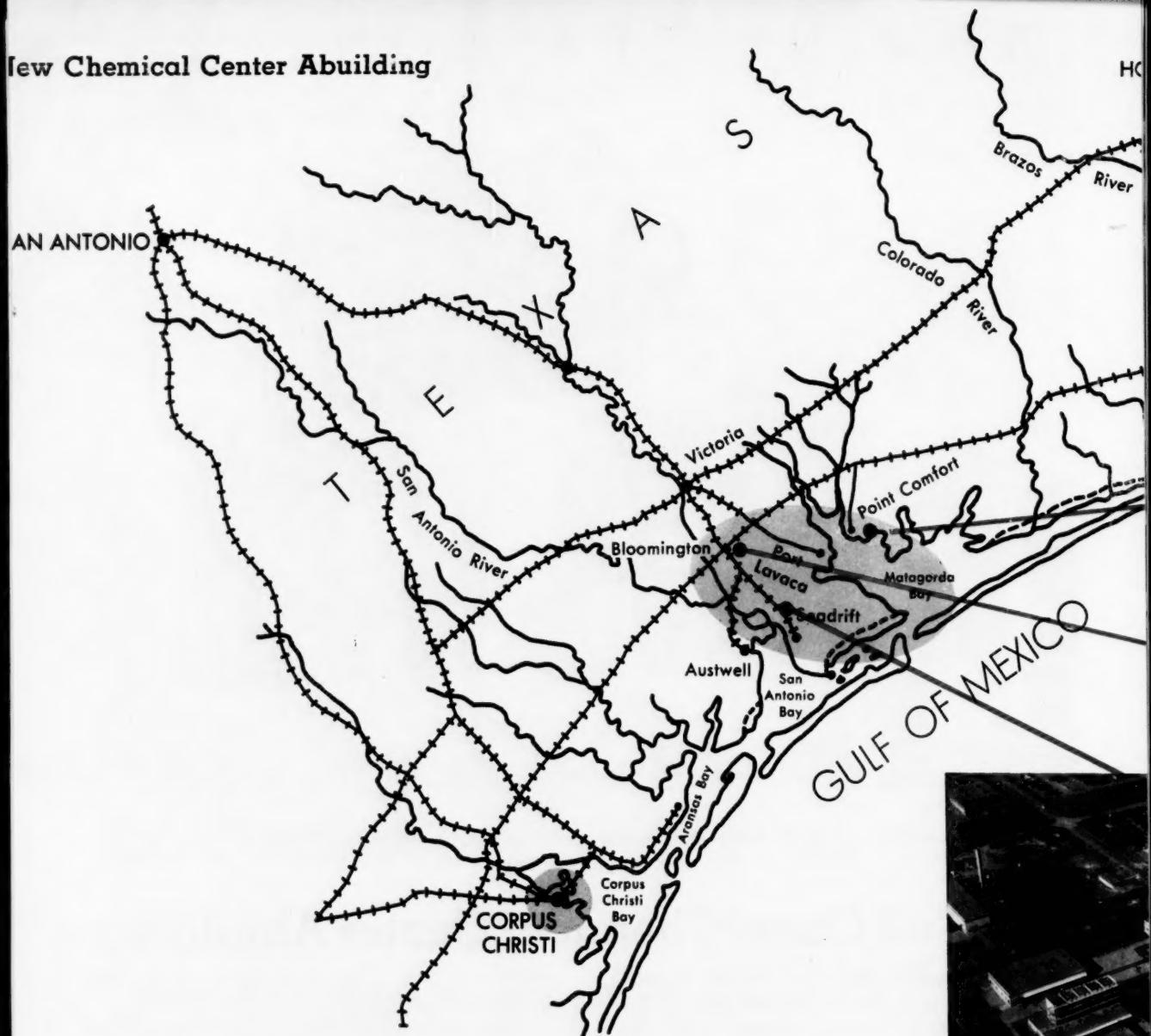
construction there: a unit for production of low-pressure polyethylene.

Water, Oil and Gas: The natural advantages that attracted Alcoa, Du Pont and Carbide are still there as a potential magnet for other process companies. In fact, the value of the water resources is being enhanced by a series of public works projects already started and to be completed in the next few years (table, p. 60).

Water for processing, waterways for cheap shipping, and petroleum products for fuels and feedstocks are this area's big enticements for industry. Lime is available from extensive oyster-shell reefs in the bays; and some 66 miles to the east are the largest sulfur mines in Texas—the Newgulf operations of Texas Gulf Sulphur Co.

The Guadalupe River—with average annual runoff at Victoria of 1.2 million acre-ft.—provides a plentiful supply of good-quality surface water for the Du Pont and Carbide plants. Underground water is plentiful, particularly near Victoria and to the east of Point Comfort. Within eight miles to Victoria, a well that could produce more than 1,000 gal./minute can be

New Chemical Center Abuilding



In Seadrift work

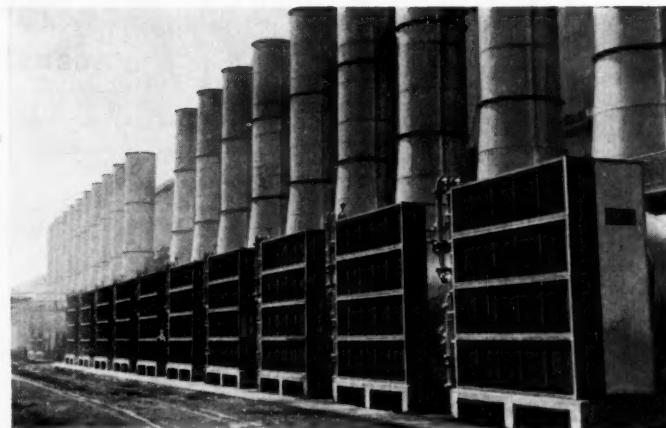
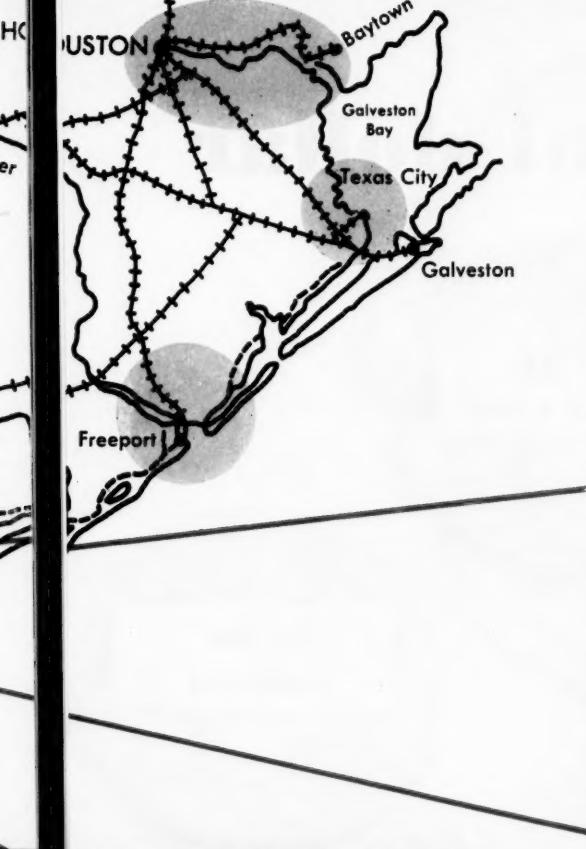
drilled at almost any location; total dissolved solids run 950-975 ppm., with fairly low sodium content and very little iron.

Channel Projects Lag: Waterways development—of vital importance for all three plants—has not been moving ahead very swiftly. So far, barge shipping can chug up and down the Guadalupe River only as far as the Carbide plant. The Du Pont plant site—chosen partly because Congress had authorized the channel project five years earlier—is still landlocked; but a bond issue has been voted to supply local funds for extension of the channel, and federal funds may be forthcoming soon.

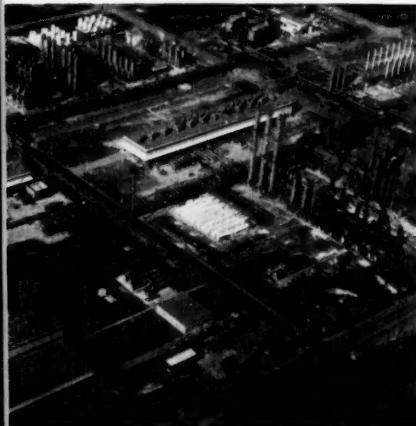
Congress also is expected to authorize a deep-draft navigation channel through Matagorda and Lavaca bays to Point Comfort, and to appropriate enough

money to start the dredging. Such a channel would make it possible for Alcoa to bring in bauxite from South America and the West Indies directly to the new alumina plant. Meanwhile, Alcoa is building a temporary transfer loading dock at Aransas Pass, about 69 miles from Point Comfort by highway. The ore brought in by 25,000-ton ships will be transferred at the dock to barges and thus carried along the Gulf Intracoastal Canal through Aransas and San Antonio bays, then up Lavaca Bay to the plant site.

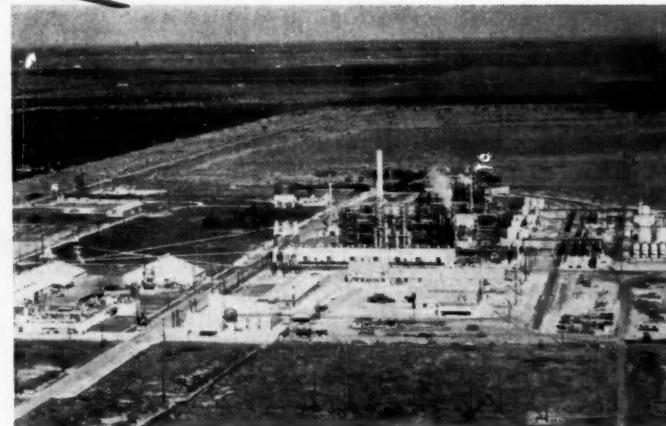
Local Fuels and Feedstocks: Close-at-hand supplies of natural gas and natural-gas liquids also were a key



At Point Comfort, stacks and coolers for Alcoa smelter.



Carbide makes petrochemicals.



Near Victoria, Du Pont expands nylon salts plant.

factor in the three companies' decisions to locate large plants in this area.

Alcoa came to Texas in search of economical electricity and equipped its Point Comfort works with power generators driven by internal-combustion engines fueled by natural gas. To supply the enormous volume of gas for this operation, Alcoa has its own gas field in Lavaca Bay.

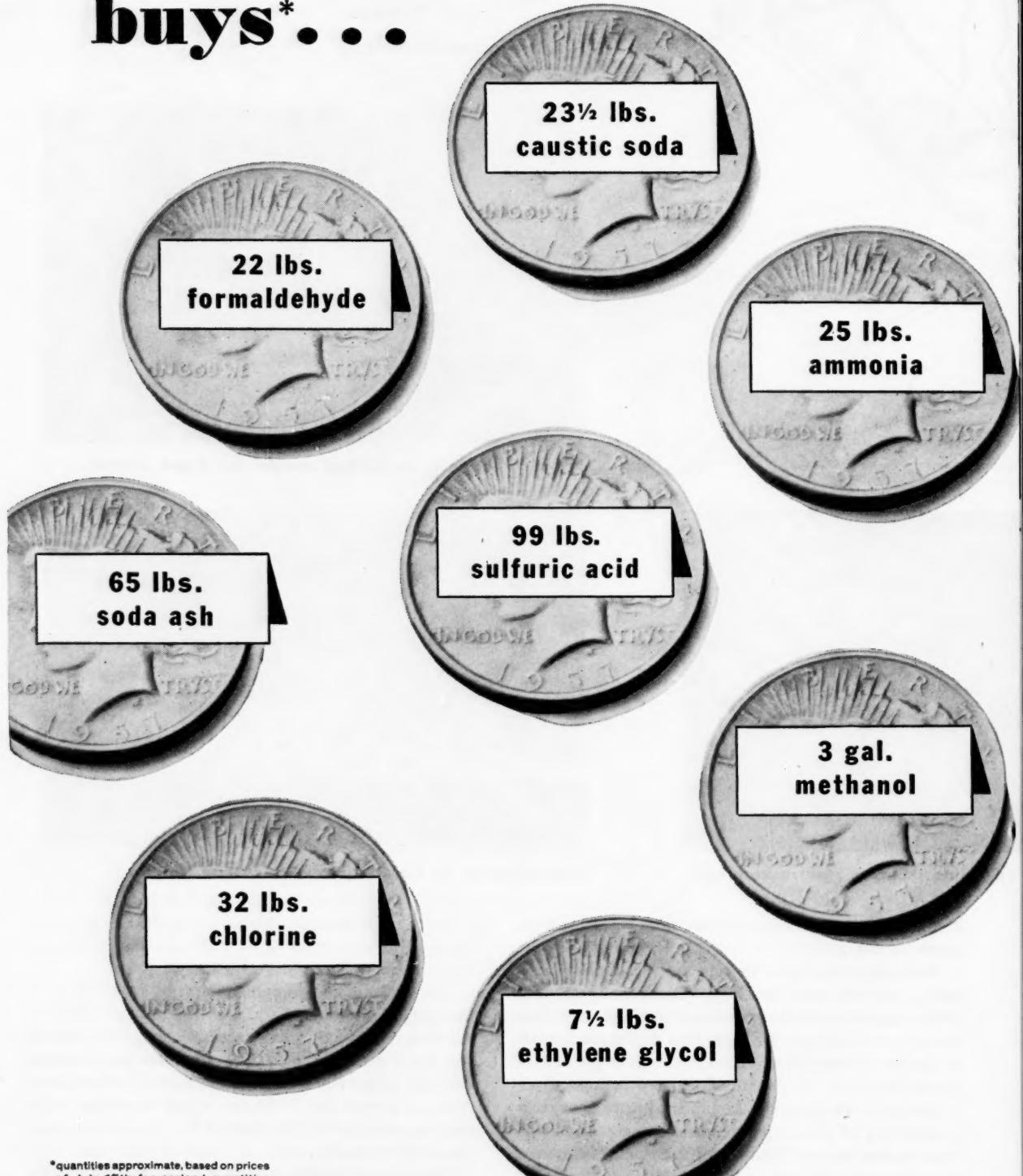
Carbide's raw materials are liquefied petroleum gases—consisting of ethane, propane and butanes—obtained from sources within 120 miles of the plant. Part comes by tank trucks, the rest by pipelines.

Du Pont's basic feedstock is butadiene. It comes from various suppliers in the Gulf Coast area, between Corpus Christi and New Orleans.

It's to be noted that there are no fewer than 15 recognized oil fields in Calhoun County (in which the Carbide and Alcoa plants are situated), not counting the big Heyser oil field that straddles the Calhoun-Victoria County line and underlies the Du Pont plant. Victoria County has 3,526 producing oil and gas wells, and the area within 60 miles of the city of that name produces 50 million bbls. of crude oil each year.

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Putting Water to Work in Victoria Area

(Public works projects authorized or proposed to facilitate industrial development of Victoria, Tex., and vicinity)

WATERWAYS

1. **Guadalupe River Channel:** 35-mile channel authorized by Congress in 1945 between Gulf Intracoastal Waterway (in San Antonio Bay) to turning basin to be constructed south of Victoria. First 11-mile stretch of this channel—from Intracoastal Waterway to turning basin northwest of Seadrift—completed in 1956.
2. **Lavaca Bay Channel:** 30-mile deep-draft channel from Gulf of Mexico via Cavallo Pass through Lavaca Bay to Point Comfort expected to be authorized by Congress.

DAMS AND RESERVOIRS

1. **Canyon Dam:** Authorized by Congress to be built on Guadalupe River, just above city of New Braunfels, about 30 miles northeast of San Antonio, for water storage and flood control.
2. **Gonzales Dam:** Authorized by Congress to be built on San Marcos River, just upstream from city of Gonzales, about 63 miles northwest of Victoria, for water storage and flood control.
3. **Hochheim Dam:** Under investigation as proposed water storage and flood control project on Guadalupe River at town of Hochheim, about 43 miles northwest of Victoria.

facilities in the Victoria County area have been operating hand-in-glove with other Texas plants of the respective companies. From Victoria, Du Pont's adiponitrile goes to the company's Sabine works near Orange to be converted into hexamethylenediamine, a nylon intermediate. Carbide ships ethylene oxide and other made-at-Seadrift products to its Texas City plant. And alumina produced at Point Comfort will go to Alcoa smelters there and at Rockdale, about 170 miles to the north.

Alcoa started out on its 3,000-acre plant site with a \$30-million unit

whose three pot lines had an annual capacity of 114 million lbs. of alumina. A \$15-million expansion program in '51 added two new pot lines and brought capacity up to 190 million lbs./year. A sixth pot line went into action last February, increasing capacity by 25 million lbs.; and a seventh pot line—now under construction—is scheduled for completion during the first quarter of '58.

The \$45-million alumina plant—now more than 25% completed—also is expected to go into production early next year. Its initial capacity will be 500,000 tons/year, but Alcoa's execu-

tive vice-president, Frank Magee, has said the company "anticipates doubling the initial capacity by 1965 to satisfy the expected smelter requirements."

At present, the Point Comfort and Rockdale smelters are being supplied from Alcoa's alumina plant at Mobile, Ala.

Designed for Expansion: Du Pont's Victoria plant was designed for expansion, and even before operation was started, work was begun to double the plant's capacity. It was estimated that this would bring adiponitrile output up to 50 million lbs./year. Capacity is now being increased by one-third, mostly through revisions in equipment size and operating arrangements. This project is to be completed by next spring.

With a 1,550-acre site a few miles from the Green Lake and Long Mott oil fields, Carbide set up in 1952-54 a \$66-million plant to make polyethylene and other organic chemicals. Early last year, it was disclosed that enough ethylene oxide and glycol capacity would be added to bring total capacity—on the ethylene oxide basis—to more than 200 million lbs./year.

The plant's ethanolamine facilities—completed last fall at a cost of approximately \$4.5 million—are now being expanded to more than double the '56 capacity; and the new plant for production of low-pressure polyethylene is now under construction. In addition, the Seadrift works is a major producer of butadiene.

Victoria is the business and banking center of a thriving area, rich in agricultural and natural resources. (Victoria County, for example, has more than 80,000 head of cattle, ranking sixth in Texas and eighth in the nation in this respect.) The area is served by two major railroad companies, Southern Pacific and Missouri Pacific; and by numerous truck lines. Its mild, subtropical climate is only infrequently interrupted by Caribbean storms. Its water problems—including waterways, water storage and drainage—are being tackled systematically. Large tracts suitable for plant sites are available along the Guadalupe River and at other locations in the area.

With these advantages, the Victoria area seems destined for continued growth as a Gulf Coast chemical industry center.



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ADMINISTRATION



At OCAW convention, delegates aim for higher pensions and . . .

Tighter Reins on Bargaining

Stronger multiplant bargaining councils, a move for more company-paid pension programs, and another attempt to arrange a merger with AFL-CIO's other chemical labor union are in the wind this week following the Chicago convention of Oil, Chemical & Atomic Workers International Union.

As to the long-ago proposed merger, the heads of the two unions are planning to confer on this subject sometime during the next two weeks; but it appeared most unlikely that any formal merger plan could be drafted before the International Chemical Workers Union's Oct. 14-18 convention in Detroit.

Step Toward Strength: The resolution that called for supporting and fostering company councils and sub-industry councils (*CW Business Newsletter*, Aug. 24) was viewed as a step toward bolstering the authority of those councils. Backed by this resolution, union officers can now draw up a specific proposal for strengthening the hand of these councils—in which local unions' participation is now on a strictly voluntary basis—and submit it to next year's OCAW convention.

Strengthening those councils would probably require a change in the union's constitution. Among the approximately 80 resolutions adopted at the Chicago convention, none involved any constitutional revision.

Delegates voted for "a concerted drive" to obtain pension and welfare plans financed entirely by employers. The goals include retirement payments (exclusive of Social Security benefits) equal to two-thirds of regular wages, to start at age 60 or after 30 years of service; financial help in case of prolonged illness; and additional death benefits for survivors and supplementary unemployment compensation for employees who are laid off.

Only contest in the election of OCAW officers came when supporters of Joseph Appelbaum—the union's district director at St. Louis and coordinator of its American Cyanamid company council—unsuccessfully tried to restore him to the vice-presidential office that he lost in 1956 when the number of union vice-presidencies was trimmed from four to two. All four incumbent officers were re-elected to one-year terms: O. A. Knight, president; B. J. Schafer and Elwood Swisher, vice-presidents; and T. M. McCormick, secretary-treasurer.

Road to Survival: The 700-odd delegates warmly received the assertion by guest speaker Walter Mitchell, ICWU president, that one strong union in the chemical industry is the members' "only road to survival" as unionists. "No matter how strong the cooperation is between our unions," Mitchell declared, "it can never take the place of one strong union."

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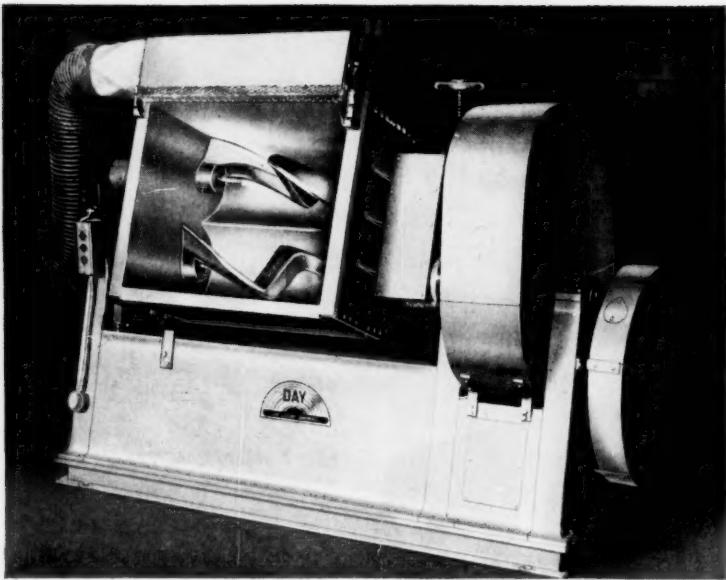
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ADMINISTRATION

Price Tags on Talent

From a starting-salary standpoint, last year's chemical engineering and chemistry graduates failed to do as well as most of their other technology-trained classmates. This is the consensus of a just-completed Engineers and Scientists of America survey of 12,484 graduates from 81 colleges and universities.

In a general ranking of starting salaries for bachelor of science graduates, the survey places the chemical engineer in sixth place, preceded by electrical, mechanical, aeronautical and metallurgical engineers and physicists, in that order, and followed by civil and industrial engineers.

Although starting rates reported for B.S. degree holders ranged from a high of \$860/month (paid to a civil

1956 Technical Graduates

Degree	Number placed	Average starting salary/month
B.S.	11,180	\$424
M.S.	1,009	502
Ph. D.	295	630

engineer) to a low of \$315/month (going to a chemical engineer), the majority of graduates included in the survey received between \$385 and \$450/month. Graduates with B.S. degrees in chemistry made a favorable showing in this group with an average starting rate of \$396.60/month.

Government Pay Lower: Several schools reported comparisons between government and industry starting rates for B.S. graduates. Generally, graduates going into government work received 10-13% less than those who elected to cast their lots with industry.

Jobs with utilities and educational institutions also paid less than industry, according to the survey. Engineers joining utilities last year started about 8% below industry yearlings, and those seeking a teaching career did so at a penalty of 15-20% in starting salary.

Advance Degree Brings More: The starting range for master of science graduates was \$433 to \$600/month, with the majority falling between \$475 and \$525/month.

Graduates with doctorate degrees received \$525 to \$1,000/month, and the survey reports little difference in starting rates between the fields. The



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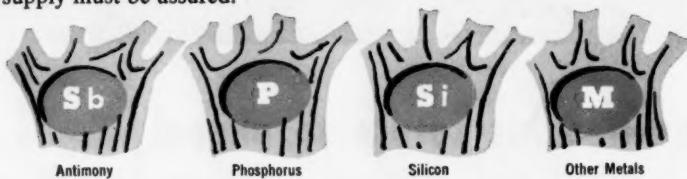
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ADMINISTRATION

one exception was the civil engineer, who fared slightly better than his fellows. Doctorate graduates in chemistry started from 12-16% below the Ph.D.s in engineering and physics, except the chemical engineering Ph.D.s, whose starting rate was just a trifle above that of the chemists.

The showing made by chemical engineers and chemists appears to indicate that (a) the ratio of supply-to-demand in these fields is greater than in other technical manpower fields; and (b) chemical companies are able to attract young engineers and scientists at somewhat lower starting salaries than are offered by certain other industries.

LEGAL

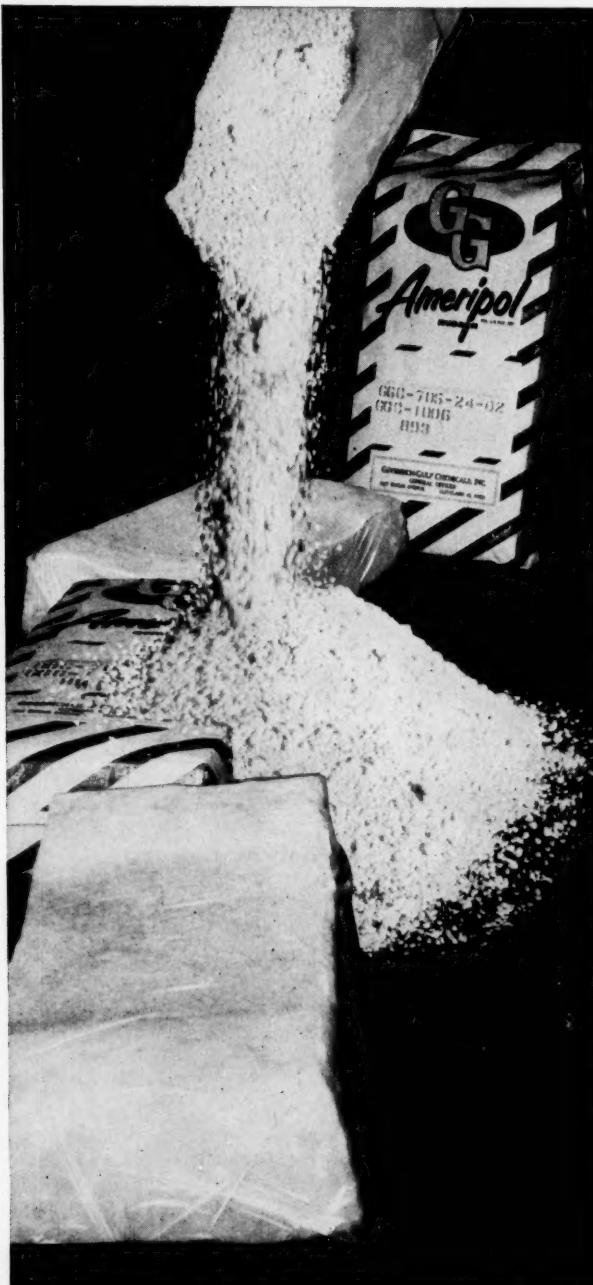
Tubeless Tire Battle Ends: B. F. Goodrich Co. has called off what was expected to be the last round in its four-year legal battle over tubeless tire patents. It has dropped its damage suit in U.S. district court (Cleveland) against Firestone Tire & Rubber Co.

Just three months ago, Goodrich lost an appeal in a similar suit against U.S. Rubber Co. when the fourth U.S. circuit court of appeals (Richmond) upheld a Baltimore court decision that Goodrich's patent infringement claims against U.S. Rubber were invalid.

(Still active, however, is the U.S. government suit—filed last May—against Goodrich, aimed at forcing the Akron firm to turn over to the government all information, plus a royalty-free license, on a process for producing Ameripol SN—a synthetic that is chemically equivalent to natural rubber [CW, May 18, p. 20]. The government—claiming the right to the new synthesis because it allegedly falls within the scope of a research contract between the two parties—says it wants to make the process available to the entire rubber industry.)

In the suit just dropped, Goodrich had charged Firestone with infringing six of its patents. Firestone denied the charges, asserting that the U.S. Patent Office had no right to grant exclusive patents to one company on tires that other companies had been working on and developing. Goodrich, recognized as having made the tubeless tire commercially successful, received several patents in early 1952. Both companies agreed to pay their own court costs.

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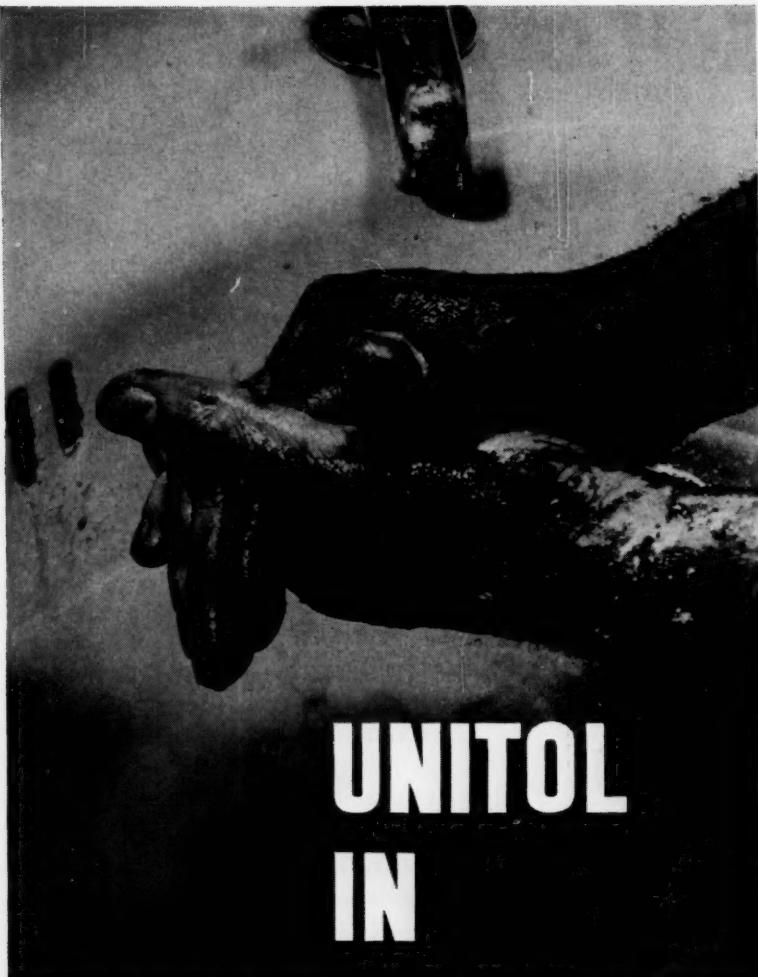
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ADMINISTRATION

IDEAS

Continental's Checkup: Continental Oil Co. for the past two weeks has thrown open its over-all operations and policies to the close scrutiny of 10 U.S. educators in hopes of getting "an objective, outside examination and evaluation" of the firm's business methods. After studying the business and talking with line and staff personnel, the professors have been asked to submit "frank impressions and suggestions" that will be reviewed with Conoco's top-management group.

LABOR

Mixed Picture: Industrial relations in the process industries are a mixture of peaceful and combative elements this week.

Strike situations were continuing at Port Neches, Tex., where officials of Texas-U.S. Chemical Co. and six of its eight unions were holding meetings to try to end the dispute that closed the plant June 10; at the Benjamin Franklin Paint & Varnish Co. in Philadelphia, where the company is continuing production while two AFL-CIO unions—the Teamsters and the Painters—squabble for representation rights; at McGregor, Tex., where a state court has ordered the Union of Operating Engineers (AFL-CIO) to limit picketing and not to interfere with construction workers seeking to enter Phillips Petroleum Co.'s rocket-fuel plant; and at Baton Rouge, La., where management at the Ethyl Corp. plant has notified striking members of District 50, United Mine Workers, that Ethyl hopes the dispute will be settled before the company finds it necessary to replace them.

But elsewhere, strikes were being settled or avoided. At Leadville, Colo., negotiations were continuing between Climax Molybdenum Co. and an independent union after a strike authorization motion failed of adoption. At New Orleans, two months of peaceful negotiations led to a three-year contract between American Cyanamid and Oil, Chemical & Atomic Workers (AFL-CIO). At Waverly, O., Good-year Atomic Corp. employees represented by OCAW voted 607 to 325 to accept a three-year contract, averting a strike that otherwise might have started three days later. And in Canada, new contracts ended disputes in

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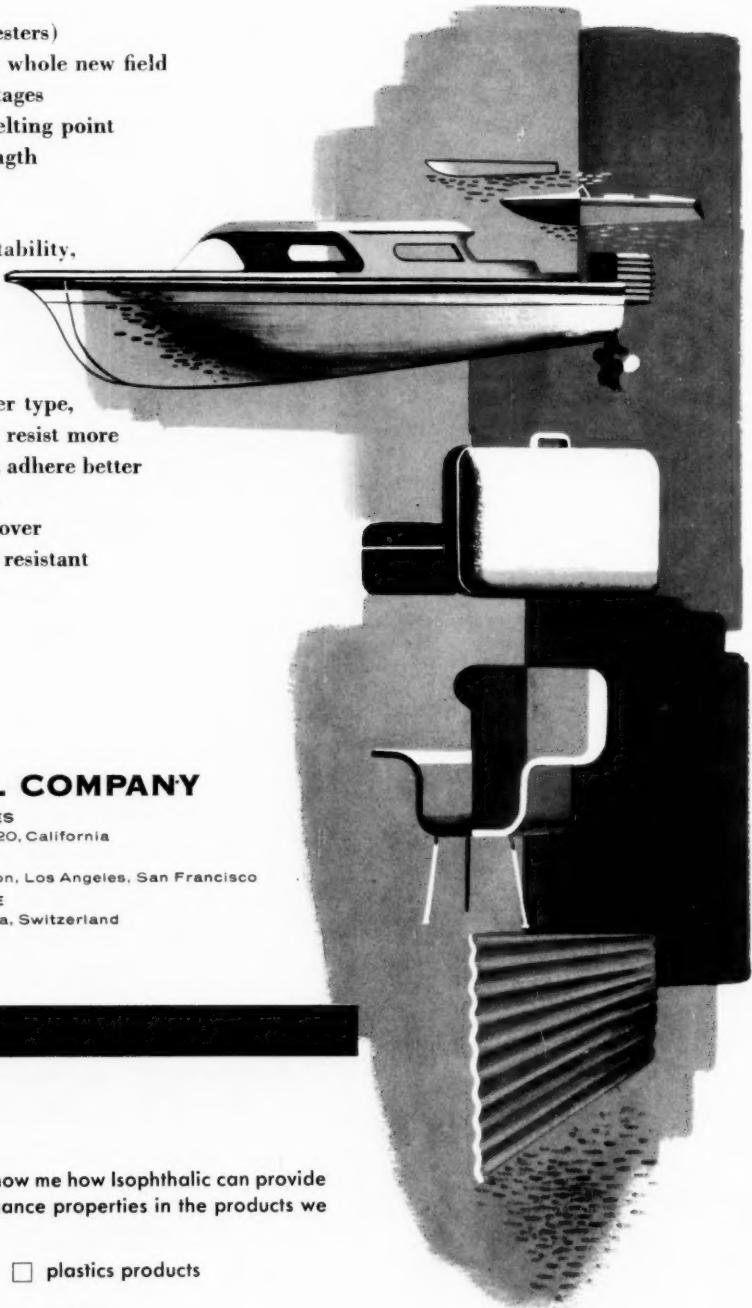
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ADMINISTRATION

volving 180 laboratory employees of Polymer Corp. (Sarnia, Ont.) and 250 employees of Merck & Co. Ltd. (Valleyfield, Que.)

Production employees of GAF's Ozalid division plant at Binghamton, N. Y., dropped their threat of a strike, accepted a two-year contract calling for a 10¢/hour wage rise retroactive to last July 1 and an additional 8¢ hourly increase next July 1. And at Rochester, N. Y., Eastman Kodak has announced a 5% pay increase effective Sept. 9 for 41,500 employees, amounting to about a \$12.5-million increase.

Costlier Pension Plan: The new and more liberal employee retirement plan approved recently by stockholders of General Aniline & Film Corp. will cost the company 50% more than the former pension program, according to GAF's president, John Hildring. In addition, the company is assuming an obligation of about \$5.5 million to provide past service credit. The new plan—already approved by GAF's board of directors—provides "substantially liberalized" benefits for both past and future services, with lower eligibility requirements and lower contributions by most employees. For employees not covered by collective bargaining agreements, the effective date is Aug. 1; and the same date will apply to the other employees, provided that agreements are reached with their unions by Oct. 31.



Hildring: For GAF employees, bigger pensions, smaller contributions.

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ADMINISTRATION

KEY CHANGES

Frank D. Andruss, to president, Alco Oil & Chemical Corp. (Philadelphia).

Robert A. Brown, to vice-president and general sales manager, Borg-Warner International Corp., division of Borg-Warner Corp. (Chicago).

Charles H. Atwood, to president, Union Carbide Caribe, subsidiary of Union Carbide Corp.

William P. Jeffery, Jr., to director of personnel, Vick Chemical Co.

James H. Curtis, to president and chief executive officer, Chemical Construction Corp. (New York).

Joseph R. Mason, to marketing manager, Sandoz Pharmaceutical Division (East Hanover, N. J.), Sandoz, Inc. (New York).

James Cunningham, to sales manager, Witco Chemical Co., Canada Ltd., subsidiary of Witco Chemical Co. (New York).

Edwin A. Norris, to general manager, Marion Division (Marion, Ind.), General Tire & Rubber Co.

R. M. Naley, to vice-president, Aluminium Limited Sales (New York), U. S. subsidiary of Aluminium Ltd. (Montreal, Can.).

A. L. Wooten, to technical director, New England Division, Reichhold Chemicals (White Plains, N. Y.).

Jack L. Wilson, R. W. Ostermayer, P. O. Powers and L. J. Reizenstein, to vice-presidents, Pennsylvania Industrial Chemical Corp. (Clairton, Pa.).

John Lloyd Huck, Jr., to director of product development, Roche Laboratories, division of Hoffmann-La Roche (Nutley, N. J.).

Burton W. Schroeder and John H. Daniels, to vice-presidents, Archer-Daniels-Midland Co. (Minneapolis).

Gary G. Grant, to technical advisor; and **James W. Flynn**, to general manager, Manufacturing Division; Lever Brothers Co. (New York).

DIED

Ward Vinton Evans, 77, explosives expert and professor of chemistry, Loyola University, at Lancaster, Pa.

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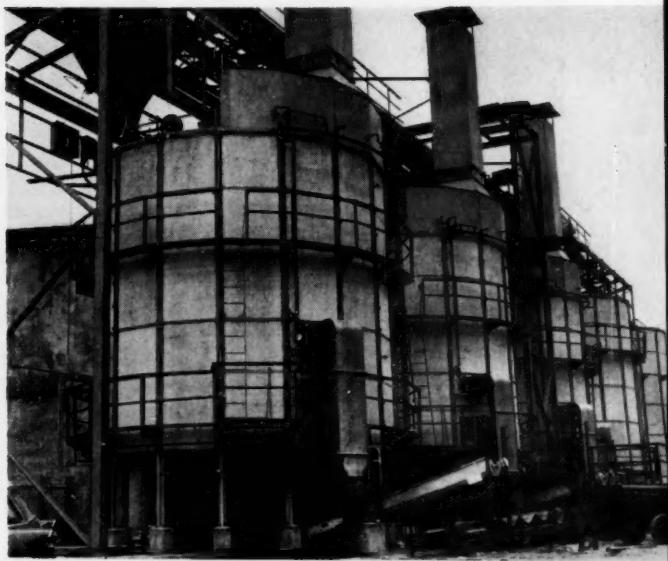
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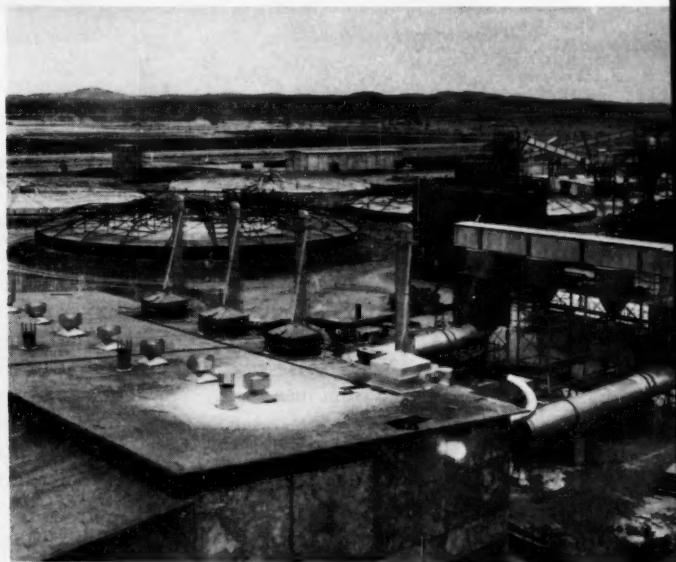
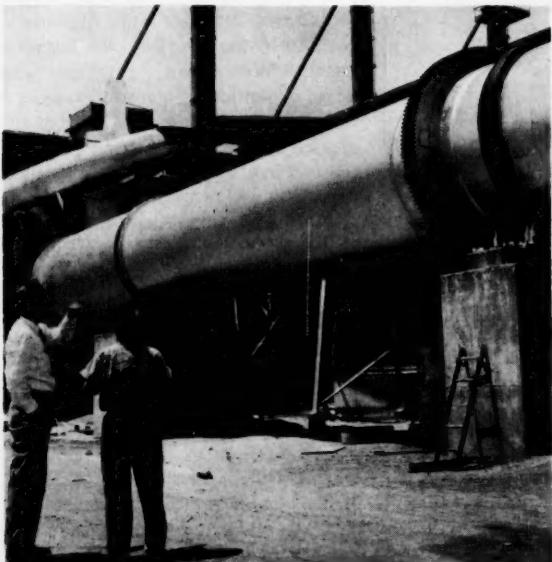
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ENGINEERING





Ore is processed at pit-side refinery (left) where it reaches driers (right) as penta- or decahydrate.



Kiln (left) calcines the decahydrate, carries it to anhydrous borax furnaces (right, foreground).

Open Pit Bolsters the Boron Boom

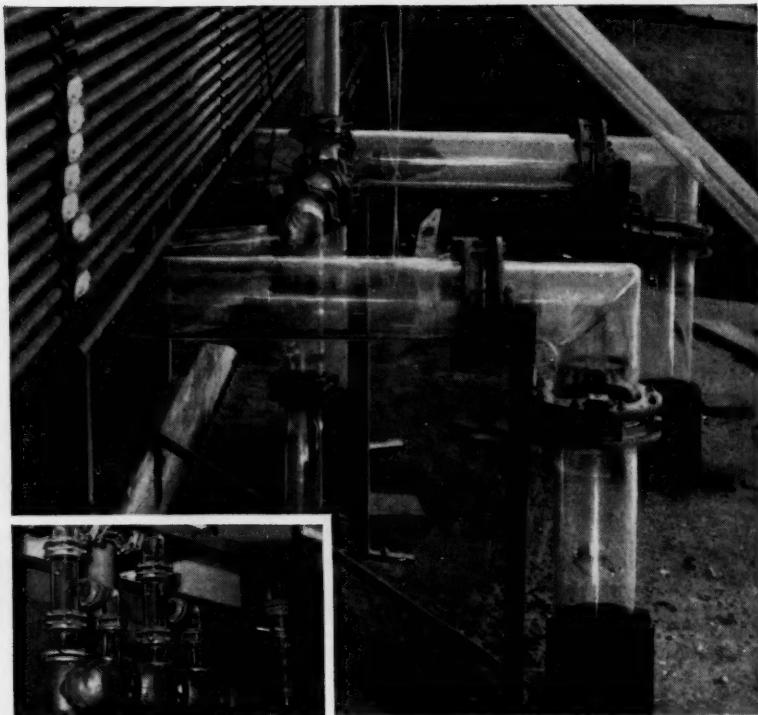
Boron has come a long way since the now-famous 20-mule teams started hauling it out of Death Valley a century ago. Its aptitude for moderating nuclear reactions carried it to a prominent role in the atomic power program; its use in the new high-energy fuels (*CW*, July 20, p. 35) opens the door to even broader chem-

ical applications. To meet the burgeoning demand for boron, U.S. Borax and Chemical Corp. this week is readying its new \$20-million open-pit mine and refinery at Boron, Calif., for full operation by mid-November.

The plant, which will be operated by USB's Pacific Coast Borax Co. Division, adds 30% to the firm's

present production capacity. And, though the actual refining processes employed at Boron are generally the same as those used in the company's 30-year-old Wilmington, Calif., refinery, the open-pit mining operation is unique to the boron industry.

Using All the Ore: The decision to go to open-pit mining was dictated by



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How glass pipe solves a mile-long corrosion problem

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per. All of the pipe was installed by the company's own pipe fitters and welders.

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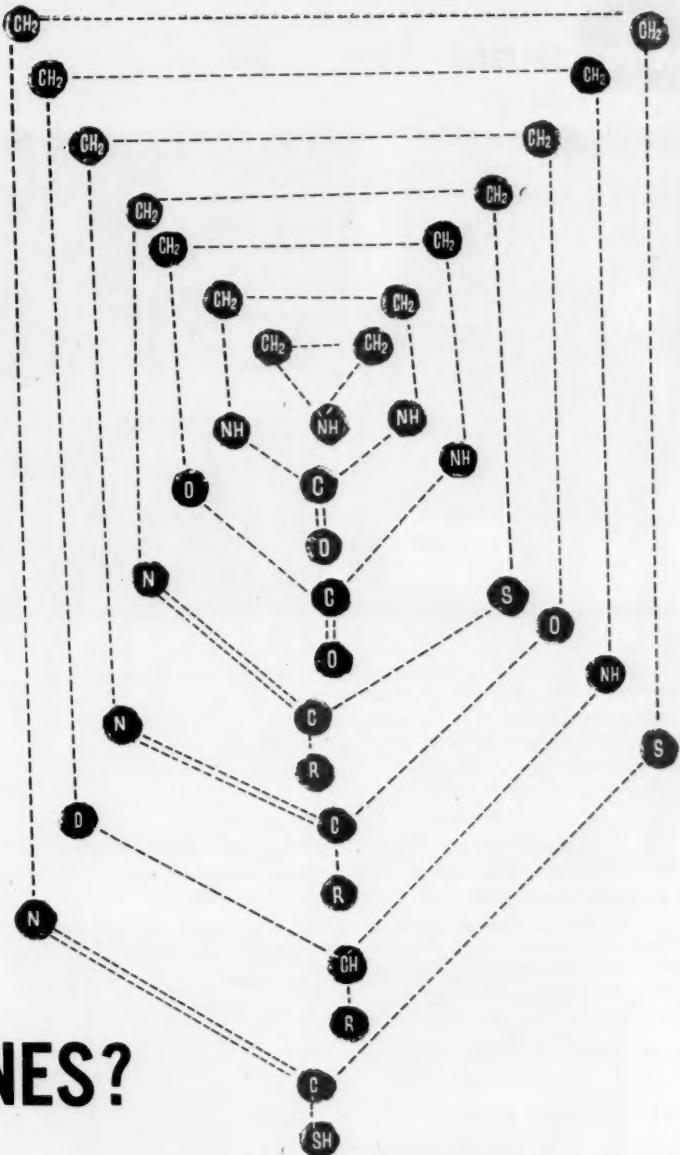
the economics of recovering and processing crude borate from the Boron deposits. Formerly, the ore was mined underground by the room-and-pillar method—the higher-grade ore being removed to form the rooms, the lower-grade ore remaining in large pillars that supported the overburden.

Selective mining of the high-grade portions of the ore body was essential to the Wilmington operation. The large quantities of gangue contained in the low-grade ore would have increased freight rates for the 150-mile railroad haul from the mine, presented a difficult waste disposal problem at Wilmington. But selective mining prevented ultimate recovery of the much-sought-after borate. The only way to offset these problems and attain maximum recovery, the company decided, was to switch to open-pit methods and build the refinery adjacent to the mine.

Excavation of the pit got under way in Jan. '56, to remove close to 9 million tons of overburden. Initially, the ore will be blasted out of 50-ft.-high benches, hauled by truck to the primary crusher on the surface. Later the crusher will be moved into the pit and the ore will be carried out by a belt conveyor. The economies afforded by this method of ore handling, says USB, were an added incentive to coordinate the mining and refining operations at a single location.

Mechanical Modifications: Though the chemistry of the refining operations remains unchanged, some of the raw-material-handling procedures at the Boron plant have been modified to compensate for the difference in borate content of the open-pit ore. Average concentration of boric oxide (B_2O_3) throughout the 80-million-plus tons of ore in the Boron deposit runs

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You can go pretty far, evidently, judging from the representative heterocyclics sketched above. All are derived through the reactive terminal hydroxy and amine groups of monoethanolamine.

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which can be salted out with solid NaOH. The yield of this very reactive, toxic, and explosive intermediate runs about 83%.

Much information on these reactions, along with general data on the reactions and applications of mono-, di-, and triethanolamine, is contained in Jefferson's technical bulletin on the ethanolamines. If you have any interest in the ethanolamines, or their derivatives, let us send you a copy. **Jefferson Chemical Company, Inc., 1121 Walker Ave., Houston 2, Texas.**

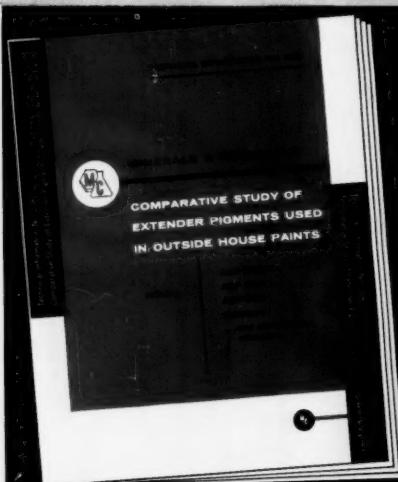
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ENGINEERING



about 25%. But by selective mining, the company has been supplying above-average ore to Wilmington.

For uniformity of the crude ore (borate and clays are stratified, vary in B_2O_3 content from strata to strata), material from different locations within the pit is alternately fed to the primary crusher. Additional blending of the ore is accomplished by stacking equipment which beds the 4-in. ore, layer by layer, into 60,000-ton storage piles. From there, the ore is withdrawn through a subterranean tunnel by vibrating feeders, transferred to a fine-crushing plant by belt conveyor.

Final adjustment of borate concentration is controlled by precise blending of fine ore from four storage bins—each of which is sampled continuously as it is filled. Laboratory analysis of the samples taken during each filling interval determines the feed rate from the various bins, permits exact control of feed to the dissolving plant.

Process Efficiencies: As it did at Wilmington, the process cycle at Boron consists of dissolving the ore, separating the borate-rich mother liquor from clay by countercurrent decantation, crystallizing, centrifuging and drying the sodium borate decahydrate and pentahydrate thus obtained. Processing equipment in the new plant is of the same general type, but larger and more fully automated than that employed at Wilmington. The modernized processing system is expected to operate at much higher efficiency than could be attained by the 30-year-old plant, which was pushed to the limit to produce more than its designed capacity.

In addition to refinements in the basic processing system, improvements

"PROBLEM" EFFLUENTS . . .

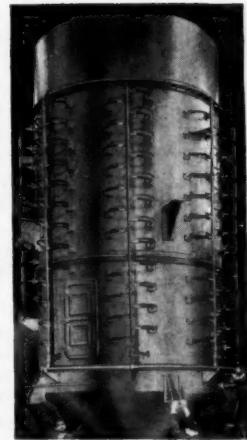
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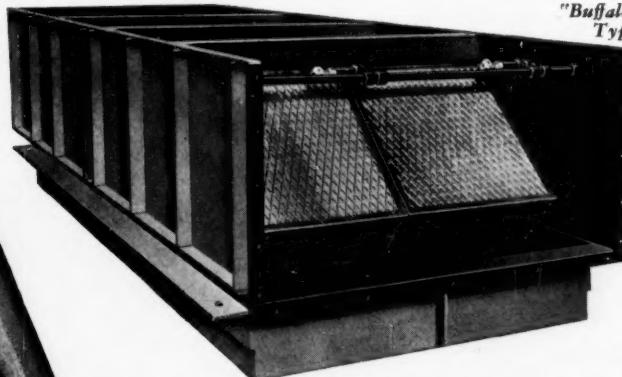
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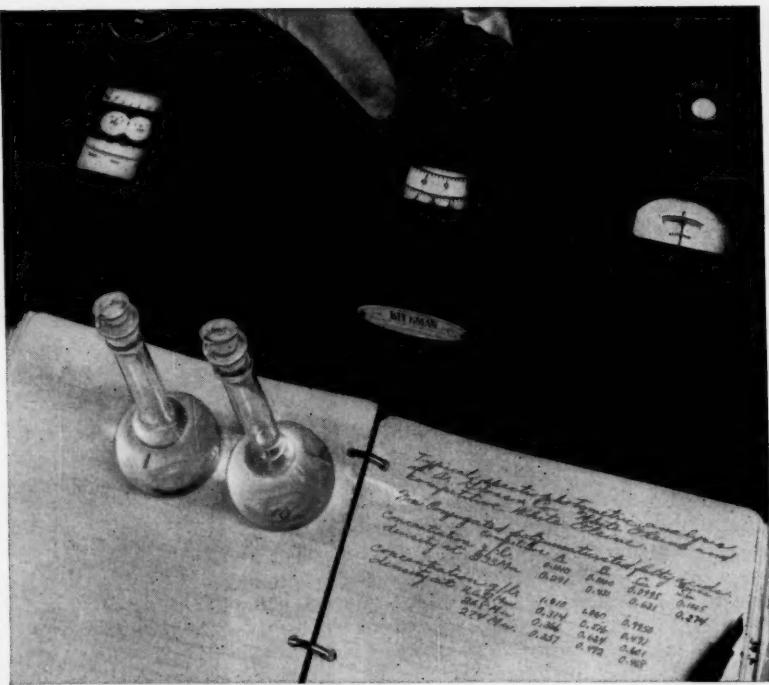
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In a recent UV spectrophotometer test with three other white oleines, GROCO 5L was shown to have the lowest quantity of linoleic acid (233 m μ wavelength). This was demonstrated by density readings of 0.291, 0.431, 0.661 for competitive acids . . . and 0.274 for GROCO 5L.

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When GROCO 5L LOW LINOLEIC WHITE OLEINE is tested against competitive oleines, the spectrophotometer clearly proves what many processors have discovered through use—GROCO 5L is lowest of all in linoleic acid content—3.5% maximum.

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GROCO 5L LOW LINOLEIC WHITE OLEINE is a straight line to the top quality end product you want . . . whether used as a chemical, in cosmetics, soaps, polishes, wool oils, or oleates. "Always specify A. Gross."

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ENGINEERING

have also been incorporated into equipment used for production of other boron products. For example, the furnaces used to convert the decahydrate into anhydrous borax have been equipped with chilling rolls that are easier, less expensive to maintain than the pan conveyors used for cooling at the old plant.

Expansion Allowance: With an eye to keeping up with growing demand for boron products, USB made provision for future expansion, estimates that capacity could be increased by 25-50% for an additional investment of \$4-5 million. Eventually the company will likely move its production of boric acid—presently maintained at the Wilmington plant—to Boron.

Another possibility for the expansion and diversification of the Boron operation is the recovery of by-product lithium oxide. Though the present lithium supply and demand holds little attraction for USB, the company could conceivably set up a separate plant to recover the lithium content of its clay tailings should a change in the marketing picture warrant.

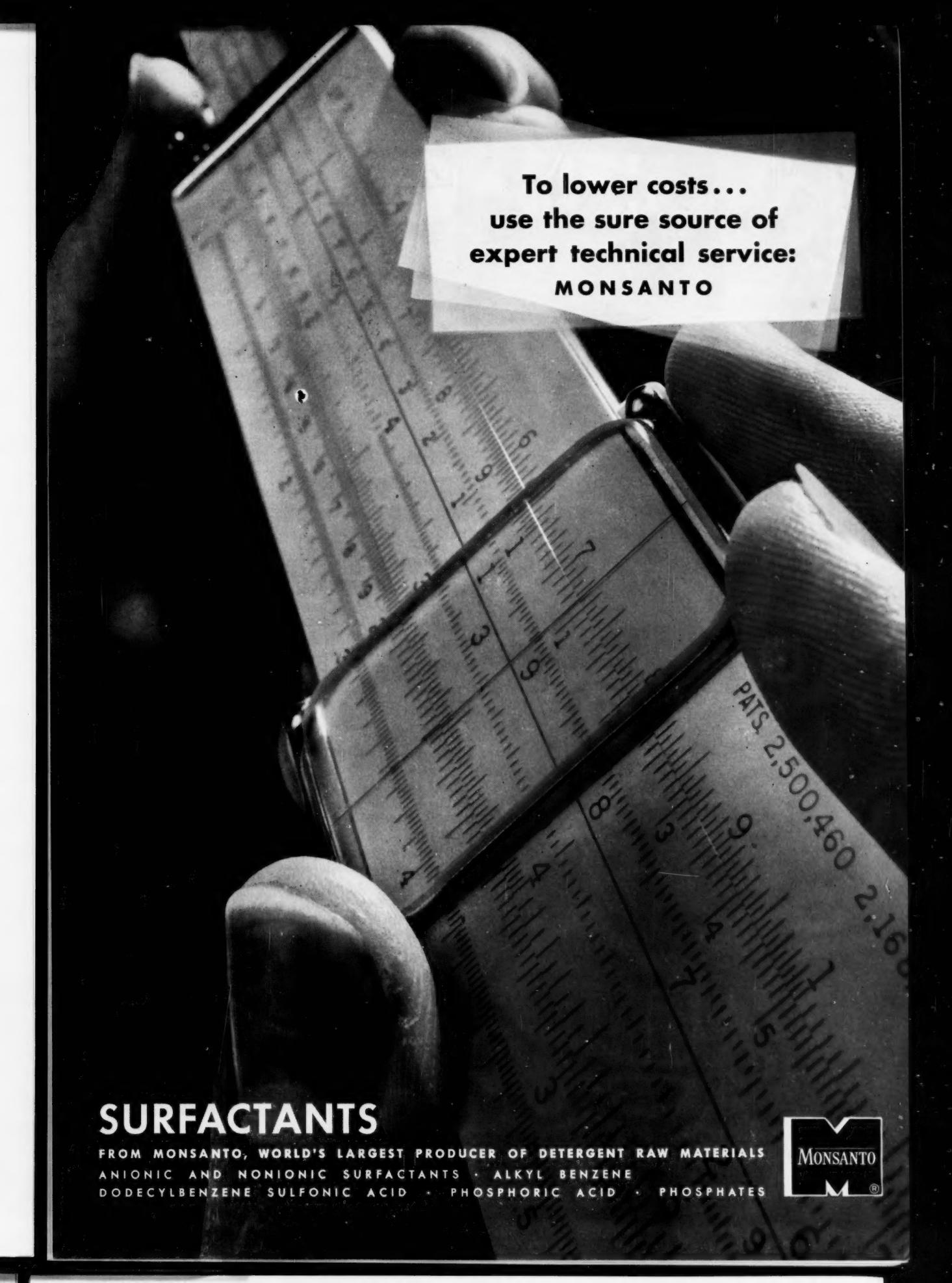
For the present, however, USB will concentrate on getting the Boron plant into full operation, expects to have no trouble selling all the borax it can make. USB President James Gerstley looks for borax demand (currently estimated at about 1 million tons/year) to double in the next 10 years as it did during the past decade.

Boron-containing fuel additives are already gaining popularity; high-energy boron fuels are being pushed for military aircraft use; boron-bearing plastics are being considered for light-weight shielding in airborne nuclear propulsion systems. With these products in sight—and many other chemical applications just over the horizon—boron should have little trouble maintaining its rapid growth.

Shortcutting to Ta, Nb

Latest entry into the scrambled field of tantalum-columbium* separation methods has proved itself in the lab, was recently stepped up to a 1-lb.-an-hour continuous operation. It's a liquid-liquid extraction developed by U.S. Bureau of Mines (Albany, Ore.), uses hydrofluoric acid, sulfuric acid and methyl isobutyl ketone (CW Tech-

*Niobium's older name, still preferred by metallurgists.



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ENGINEERING

nology Newsletter, Sept. 29, '56, p. 61). Significant feature: it not only separates the two similar metals from one another, but is also used to remove iron and other impurities that are often found in the ore.

Also developed by USBM is the newest commercial method: Fansteel's liquid-liquid extraction to be used (after about six more months of testing) at its \$6.5-million Muskogee, Okla., plant (scheduled for October startup). Using hydrochloric acid and a ketone mixture, this version (CW, April 28, '56, p. 62) is a giant step from the 90-year-old Marignac fractional-crystallization process that required relatively high-grade ores. Fansteel's extraction method is capable of handling iron-containing ore, but an extra processing step is necessary to remove the impurities.

Importance of new techniques in this field is underscored by the number of firms engaged in process development and the relative dearth of production. In addition to the Bureau of Mines processes, new separation techniques are claimed by Kawecki, Electro Metallurgical Co. (division of Union Carbide), Horizons Titanium and National Research. Only Kawecki has joined Fansteel in commercial production, however. And demand for both metals appears to be headed nowhere but up: tantalum for chemical process and electronic equipment and cemented carbides, columbium for high-temperature alloys, stainless steel, nuclear construction materials.

Coextraction: As worked out by USBM, the new process starts with a mixture of hydrated oxides, obtained by chlorination of the ore followed by hydrolysis. An aqueous feed solution is made by dissolving the oxides in a mixture of hydrofluoric acid (5.6 N) and sulfuric acid (9.0 N) to a maximum concentration of 100 grams per liter. Treatment with methyl isobutyl ketone results in selective co-extraction of the tantalum and columbium compounds in the organic layer, leaving impurities behind in the aqueous phase. A single extraction yields maximum purity.

That's when the unusual feature of the new method comes into play, for the same reagents that were used to coextract tantalum and columbium compounds are then used to separate them. The only change is in the acid

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- to extend pigments
- to aid suspension
- to reduce surface sheen

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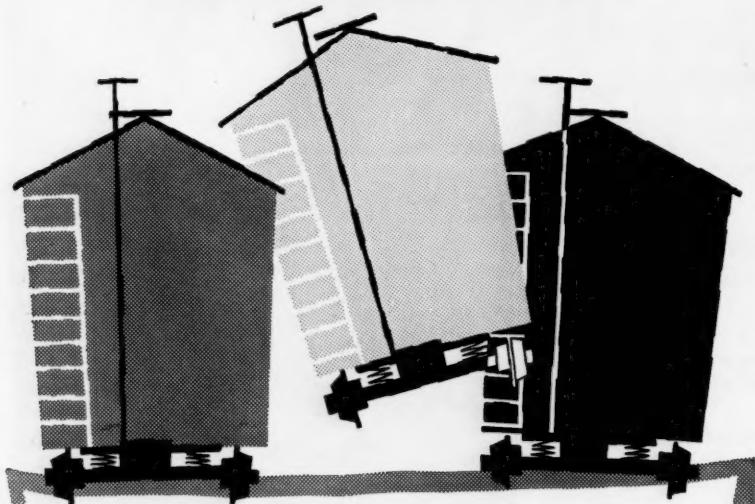
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concentrations: 1-3 N hydrofluoric and 1-6 N sulfuric are used, depending on the tantalum/columbium ratio. Treatment of the organic layer from the initial coextraction with this weaker acid mixture selectively removes the columbium compound.

The ease of separation and the number of re-extractions, or washings of the respective layers from the back extraction, also depends on the starting ratio of tantalum to columbium. Although the method is successful whether the ratio is 10:1 or 1:10, high-columbium materials offer the easiest operation, require no washing of the columbium-containing aqueous phase. High-tantalum ores, on the other hand, require that the organic layer (from the back extraction) be washed with dilute sulfuric acid, as it still contains up to 1% columbium. Hardest to separate are the roughly equal mixtures, since both layers require washing.

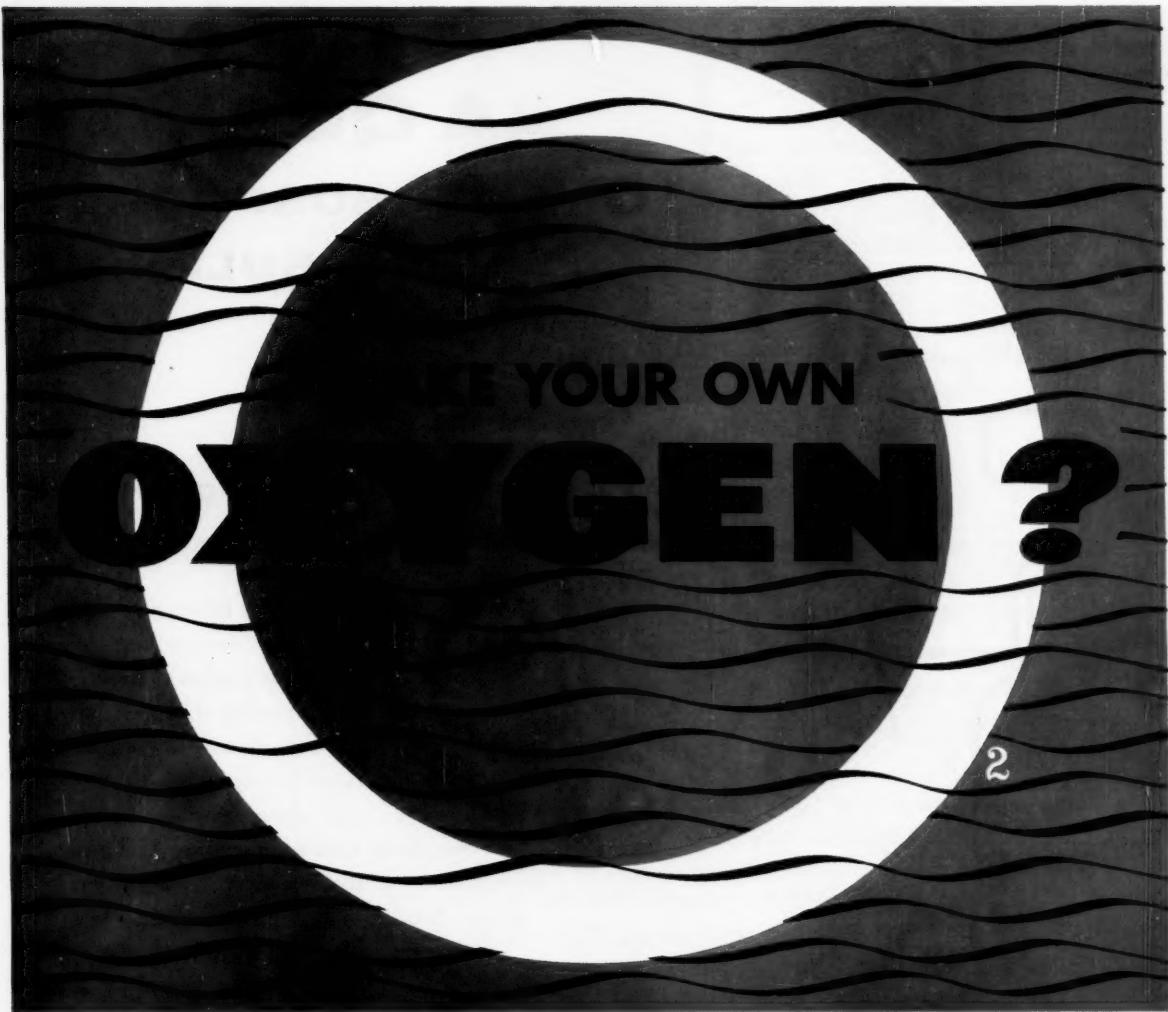
High Purity: Optimum treatment by the method outlined above is said to produce separated tantalum and columbium compounds of greater than 99.9% purity. And the recovery rate is about 90%, with the other 10% recycled rather than lost. From this point, conventional processing converts the oxide to high-purity metal.

Present USBM tests with Belgian Congo tin slags and Idaho euxenite in the successfully running, scaled-up unit should provide an economic evaluation of the process a few months.

PROCESSES

Alkyl Amines: American Alcolac Corp. will use an unidentified new process to make alkyl amines at its Baltimore plant. Scheduled for commercial startup this fall, the new unit will first produce lauryl dimethyl amine, later swing into a broader range (including higher-molecular-weight amines).

•
Nylon Coatings: A German process for applying nylon coatings to metal surfaces is offered under license by Polymer Processes, Inc. (Reading, Pa.). Like American Agile's (CW, Dec. 3, '55, p. 93), PP's Whirlclad process consists of dipping a pre-heated object into an air-fluidized bed of finely divided dry nylon powder (possibly blended with metallic powder).



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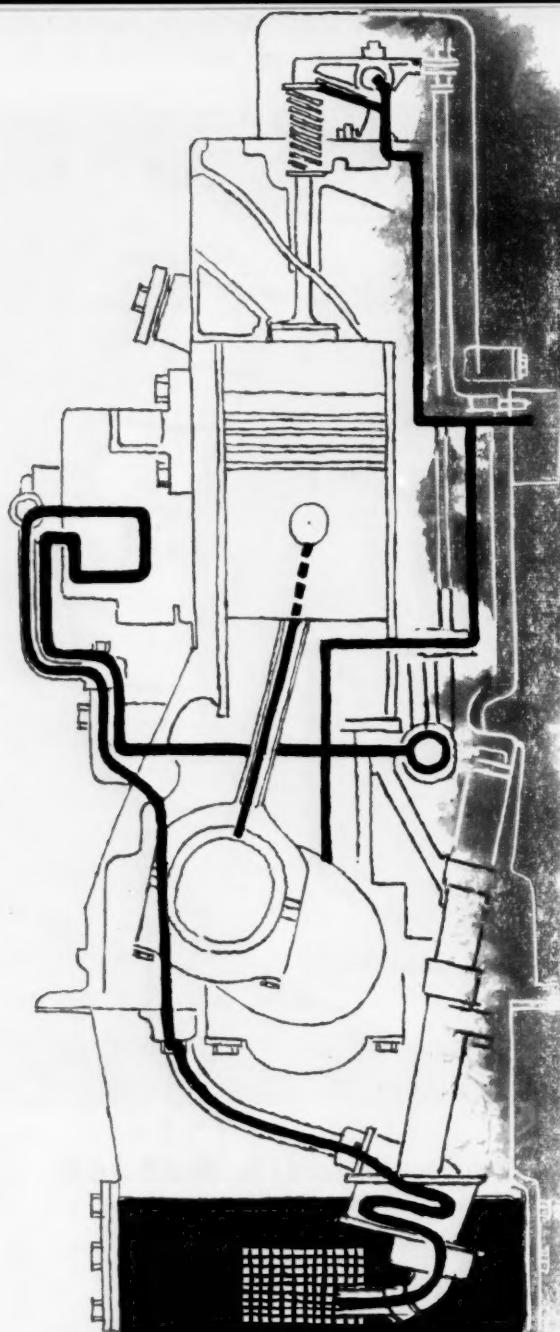
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Technology Newsletter

CHEMICAL WEEK
August 31, 1957

Clues to the makeup of Dow's Zefran fiber are starting to emerge.

Though Dow has steadfastly refused to discuss the nature of the fiber, calling it only a nitrile alloy, a recent Australian patent application (23495/56) may go a long way toward explaining the fiber's unique structure and Dow's insistence on calling it an alloy.

The patent application describes a method of treating a material that's essentially polyacrylonitrile with a dye-receptive monomer. The monomer is then polymerized *in situ*. A number of monomeric substances may be used but three are cited as being preferable. One of the preferred: vinyl pyrrolidone, the other main ingredient of Zefran. (Dow has never publicly acknowledged any ingredient other than acrylonitrile.)

Don't be surprised if Dow makes its own vinyl pyrrolidone. It will have the raw material (acetylene) and the need (possibly 2 million lbs./year for its initial fiber operations). And it has been quietly taking a gauge of the over-all vinyl pyrrolidone market.

Moreover, Walter Reppe, the "father" of high-pressure acetylene chemistry, was over from Germany not too long ago and is believed to have spent some time with Dow.

There have been persistent reports in industry for some time that Dow would eventually make its own vinyl pyrrolidone. An important point to remember, though, is that the compound is merely one product of high-pressure acetylene chemistry. A firm wishing to make it by traditional Reppe chemistry must prepare to make a whole raft of other acetylene derivatives as well. Thus, the decision to make it or not is a lot more complicated than it would seem at first casual glance.

An old drug will hit rheumatoid arthritis from a new quarter. Winthrop Laboratories is pushing its Aralen chloroquine, an antimalarial, for the job. The company says the product "seems to act on the disease itself," shows no cumulative toxicity (after four years of tests), has already been approved as a drug by the FDA. But though it seems to have a quicker response on the general health and well being of the patient than some of the established antiarthritics, it doesn't reduce swelling as swiftly as cortisone and other steroids do.

But Winthrop says that it's a control rather than a cure. And doctors, who have learned to be cautious in accepting new drugs to combat arthritis, may prove hard to convince. In any case, the drug is not likely to steal much thunder from cortisone at least for some time. For it's likely to be used in conjunction with cortisone, or other, therapy.

A new wool shrinkproofing process developed by the U. S. Dept. of Agriculture's Western Utilization Research and Development

Technology

Newsletter

(Continued)

Division (Albany, Calif.) may help counter the fiber's waning textile importance. It involves application of a mixture of polyamide and epoxy resins to the wool fabric, is reportedly cheap, odor-free, permanent to repeated launderings. Also, tear strength is said to be unaffected by the treatment. But the resins do stiffen the fabric somewhat; so the USDA researchers, led by project director Harold Lundgren, are experimenting with softening agents, lower resin concentrations.

There's a new note of urgency in wool research (*CW, July 16, '55, p. 38*) that's keyed to the fiber's falling markets. Wool accounted for 31% (on a dollar basis) of the fiber market in 1948 and only 15% in 1955. Unless wool's characteristics are improved, Lundgren believes, its share of the 1960's fiber market may be only 12%.

Animal and plant tumors are being controlled through the use of antiauxin, a naturally occurring plant hormone, in studies by University of Wisconsin researchers. The tumors—laboratory induced—were most effectively inhibited when the hormone was used in dilute (0.0025-0.0050%) solutions.

The same hormone also limits the development of skin cancers on mice brought on by animal carcinogens such as 3, 4-benzpyrene and methylcholanthrene, as well as swelling of lymph nodes, kidney and spleen caused by the chemicals. Since both the chemical agents and antiauxin are fat soluble, the researchers suggest the origin of tumorous growth may lie in the realm of fatty metabolism.

A thin film of gold may help to pierce the thermal barrier. That, at least, is what North American Aviation says about its new "reflectant noble metal coatings." The gold is applied by brushing, spraying or dipping in thicknesses between 25/1,000,000 and 1/100,000 of an inch. It's placed either on the metal engine shroud or a high-temperature ceramic coating over the shroud prior to heat treating.

The idea is that the gold coat protects the engine from heat and corrosion on the inside. And an exterior coating cuts down on the heat radiated outside onto components and structure of the plane. Silver can be used too, the firm says, but does not work out as well as gold. The firm has filed a patent application on the coatings.

Purer high-melting metals can be made directly from oxides by a new patented process (U. S. 2,803,536) developed at Illinois Institute of Technology. The method consists of reacting the oxide of a metal such as titanium, zirconium, chromium, hafnium, niobium or vanadium with aluminum under conditions that permit complete removal of the oxygen. Lucio Mondolfo, director of metallurgical engineering at IIT, reports that the process is simpler, less expensive to operate, has yielded purer metal than can be obtained by present methods.



An old bromide about chlorides!

The old bromide that a salted tail immobilizes a bird has frustrated children for generations. Another old bromide that chlorides are ruinous to engineering metals has plagued design engineers for decades. That was before titanium.

Strong ferric, stannic and mercuric chloride solutions have no effect on titanium. Extraordinary resistance to mineral acids is shown by excellent performance in boiling 65% nitric acid.

Boiling glacial acetic, concentrated lactic and concentrated formic acids are completely resisted by titanium. Even vapors are non-corrosive.

Titanium is more than a "promising" metal for the chemical-processing and pulp industries. It's already paying for itself in applications where severe corrosion once posed forbidding maintenance or design problems. Titanium means longer service life, less down-time.

All forms of titanium—tubing, sheet, wire, strip, plate, extrusions, bar and billet—are routine production items for TMCA, at prices attractively competitive with other engineering metals. Extensive research facilities and trained technical service personnel are available to provide quick answers to specific requests.

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The Welland Canal locks are navigated by the S. S. Hemlock, one of 90 units owned by Cargo Carriers,

U.S. Inland Waterways: Bustling

Round-the-clock operation of locks on the United States' 28,996 miles of navigable inland waterways was this week more and more a matter of routine, rather than convenience, as shipments swell to record levels. Helping to swell the total: chemical shippers, who this year should ship some 10.5 million tons of product (up 140% since 1950).

Chemicals shipments far and away outpace the general increase in shipments on waterways—35% since 1950. The situation is reminiscent—though, of course,

not comparable—to the nineteenth century, when the nation's waterways carried the bulk of moving freight. But the trend today is in waterways' favor. Whereas in '50, railroads carried 59% of all U.S. freight, with inland barges carrying only 3%, railroads this year should carry about 46% while inland waterways carry 10%.

The chemical industry is one of the propelling forces behind this teeming resurgence of traffic along the nation's rivers and canals. While chemical ship-

ers,

Inc., haulers of chemicals, coal and grain on the central U.S. rivers and the Great Lakes.

g Thoroughfares for Chemical Shippers

ments amounted to only 2.1% of all waterways traffic in 1951, its proportion by 1964 will likely have grown to 5%.

Bulks Are Biggest: Of course, bulk commodities represent the largest volume of waterways shipment, with sulfur and sulfuric acid the leaders.

Sulfur has scored one of the biggest increases in barged shipments of any chemical (see table, p. 94). Last year an estimated 2.8 million tons were transported, some 75% more than in '51, when shipments

were about 1.6 million tons. Barge shipments of sulfuric acid have also shown a remarkable growth. Last year some 1.8 million tons of the acid were moved along the nation's rivers and channels, up 50% over '51's tonnage.

Makers of industrial chemicals and chemical specialties have also turned to inland waterway shipments of their products. Transportation of these items has jumped a hefty 30% since '51; last year's tonnage was about 2.9 million tons. Barge movement of coal-

Chemicals Carried on U.S. Inland Waterways[†]

(thousand net tons)

	1951	'52	'53	'54	'55	'56 (CW est.)
Sulfur	1,571	1,636	1,738	2,191	2,623	2,750
Coal-tar products	949	776	1,007	986	1,276	1,500
Medicinal, pharmaceuticals	1	2	3	*	*	*
Sulfuric acid	1,224	995	1,195	1,735	1,705	1,800
Industrial chemicals, chemical specialties	2,230	2,387	2,641	1,734	2,691	2,900
Pigments, paints, varnish	96	38	8	17	6	6
Nitrogenous fertilizers	59	60	80	53	26	30
Phosphate fertilizers	247	317	316	390	403	500
Potash fertilizers	23	24	9	4	8	8
Mixed fertilizers, others	236	157	116	121	201	250
Miscellaneous chemical products	27	42	63	49	36	40
Total	6,662	6,434	7,176	7,280	8,975	9,784

[†]Other than the Great Lakes.

*Less than 500 tons/year.

Shipments (thousand tons)

	Chemical total	Total inland waterway traffic	Percent chemicals
1951	6,662.0	325,434.0	2.1%
1952	6,434.0	320,617.0	2.0%
1953	7,176.0	327,519.0	2.1%
1954	7,280.0	319,781.0	2.3%
1955	8,975.0	362,556.0	2.5%
1956 (CW est.)	9,784.0	375,000.0	2.6%

Source: Corps of Engineers, Dept. of Army; Prepared by: The American Waterways Operators, Inc.

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt



How Large Plants Reduce Costs of Salt Handling and Brine Making

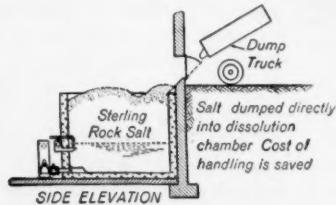
Many of today's large users of brine are saving money on salt deliveries, on handling salt in the plant, and on the production of saturated brine... by installing one rugged, permanent piece of equipment, a Storage Lixator. This unit (the exclusive development of International Salt Company) is a large combination salt-storage and salt-dissolving tank.

The Storage Lixator is strong—can easily hold the weight of heavy trucks or railroad cars. It's adaptable—can be located almost anywhere, either below or above ground, either inside the plant or outside. It's fully automatic—continuously replenishes whatever amounts of brine are drawn off through the piping system to points of use. And it needs no maintenance.

Another money-saving feature: with the Storage Lixator, brine-storage tanks are rarely necessary. This is because International's Lixate principle, on which every Storage Lixator is based, makes use of "Wet Storage"—meaning that undissolved salt is stored in the same tank with saturated brine. Even when the Lixator is completely filled with salt, there is ample room between the salt crystals for storing fully saturated brine.

The operation of every Storage Lixator is basically the same, but there are many design possibilities, by which International's Lixate principle can be adapted to any plant requirements. Here are some typical Storage Lixators, showing how they are engineered to meet specific needs.

1. The Inside Single-Compartment Storage Lixator... ideal for congested areas where outside property is not available.

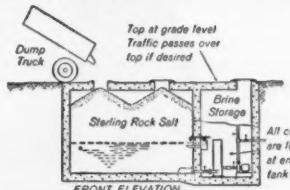


Salt is dumped from a truck directly into the dissolving chamber (the Lixator is just inside the plant wall), and salt-handling costs are reduced. The Lixator controls

are easily accessible from inside the plant.

2. The Shed-Type Storage Lixator is very practical for small-scale storage and dissolving operations when space is available adjoining the plant building. Large doors permit easy salt entry by portable conveyor belt fed directly from a dump truck or railroad car. With this setup, any available space can be used for an inexpensive brine-making unit inside the shed.

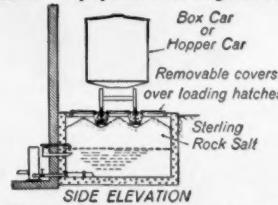
3. The Integral Brine Tank Storage Lixator... one of the best for manufacturer-



ing operations which require large amounts of fully saturated brine only at certain times. (The brine-storage tank included in the Lixator can be made as large as necessary.) Because the top of this Lixator is at ground level, traffic can pass over it—and delivery trucks can pour salt directly into the loading manholes.

4. The Underground-Tank Storage Lixator is a single-compartment rock-salt storage and dissolving unit which adjoins a railroad siding. With the top of the Lixator on the same level as the floor of the railroad car, salt delivery by power scoop, or portable conveyor belt is an easy operation. Fully saturated brine, made automatically in this Lixator, can be pumped any distance to the points of use.

5. The Undertrack Dual-Unit Storage Lixator... popular with large salt users.



It has been found that its relatively high installed cost is more than offset by the

most inexpensive salt delivery method known today (and possible only with this undertrack design). A railroad hopper car passes over the Lixator, and salt drops directly into storage. No conveyor belt is needed, and salt delivery is entirely automatic.

6. The Dual-Compartment Storage Lixator is designed for plants which use exceptionally large amounts of saturated brine. There are two separate dissolving compartments, storing an ample supply of brine for every need. The control room is located between the two storage and dissolving chambers. This unit, with its extra-large storage capacity, permits very economical purchasing and handling of salt.

There are many other types and designs of Storage Lixators—along with numerous refinements to suit your particular needs.



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Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

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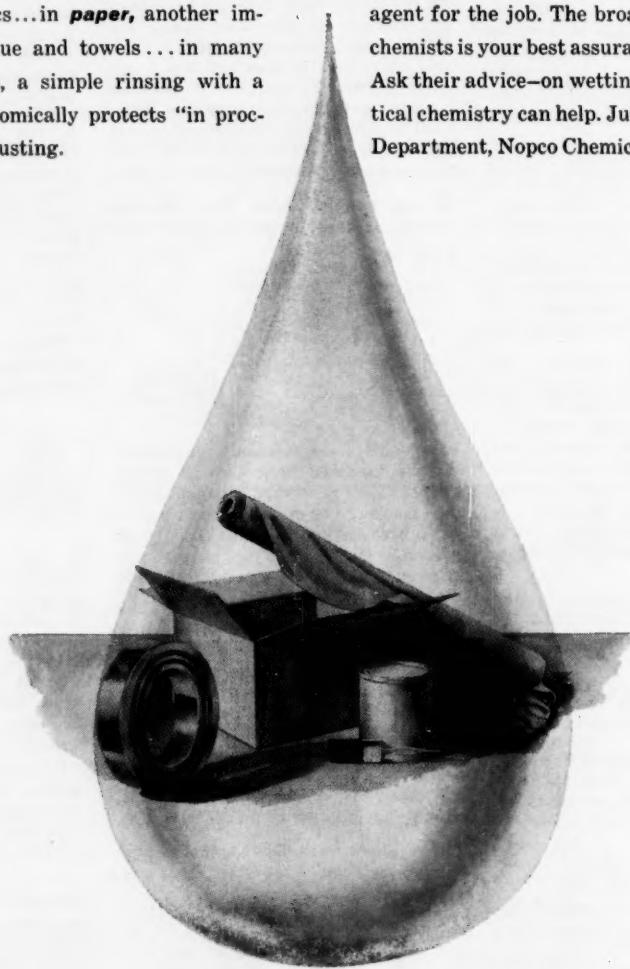
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Close to 700 inland waterway barges will be launched this year—about 10% more than in '56.

tar product picked up a sizable 58% since '51; it totaled some 1.5 million tons in '56. Although barge shipments of some chemicals (e.g., pigments, paints, varnish and medicinals) have decreased over the years, the trend today is definitely up.

Underscoring this spiraling growth of chemical shipments is the rush by leading chemical companies for choice building sites along rivers and canals.

American Waterways Operators, Inc., reports 375 chemical company expansions have been completed since '52 or are now under way. Here's how some of the more important water routes have fared:

- Mississippi River: Some 60 chemical installations and expansions on its banks have boosted chemical shipments along this route. Close to 8 million tons will be transported in '57. This represents a sizable 70% jump over '52's shipments of about 4.7 million tons, and about 8% of total traffic moving along the Mississippi River.

- Gulf Intracoastal Waterways: Second in the lineup of busy routes for chemical shipments, it boasts more than 50 new plants and expansions since 1952. Chemical shipments here will total some 2.8 million tons by the end of the year. This represents about 6.8% of total traffic moving along this route.

- Ohio River: Third in importance as a center of chemical activity, it has had 55 new plants and expansions since '52. And during '57, chemical shipments along this waterway should easily hit 2.3 million tons, a healthy 44% increase over '52's 1.6 million tons.

- Hudson River: Although there has been construction of only one significant installation by a major chemical producer since '52, Hudson River chemical shipments have increased 50% within four years. By the end of '57, shipments will have hit about 1.5 million tons, compared with 1 million tons in '52.

Why this trend by the chemical industry toward waterside plant sites, increased waterway shipments? B. B. Burr, president of American Waterways Operators, Inc., points out three important factors: rising freight costs by competitive shipping methods; unlimited supply of usable water; economical electric power.

Freight Costs Set the Pace: The chemical industry is one of the largest producers of bulk and liquid materials and semifinished products suited to modern barge transportation. Today's chemical-carrying tank barges range from 250-500,000-gal. capacities, compared with the average 8-12,000-gal. tank car. Labor requirements, of course, are greatly reduced by han-

dling large quantities in a single barge; and also by the moving of multiple barge units by a tow. Spillage is decreased, and wear and tear on equipment in unloading and loading is minimized. These factors help keep shipping costs down.

Take, for example, these figures from Freeport Sulphur, comparing the shipment of sulfur by rail and by barge from Port Sulphur, La.

	By Rail	By Barge
To St. Louis	\$12.10	\$3.07
To Chicago	\$12.54	\$4.01
To Pittsburgh	\$19.49	\$4.92

Water Demand Factor: With channels being deepened to keep up with larger barges, more water is becoming available for process use. That's an important consideration, since the chemical industry is one of the largest consumers of water. The industry probably consumes close to 3 trillion gals./year. The need for water continues to become more acute as all industries expand. By 1975, government figures show, water demand by industry alone will hover at 115 billion gal./day, just about double today's demand.

Electric Energy Need Grows: As more chemical, steel and aluminum plants continue to be built along the nation's waterways, increased elec-

SALES

trical energy is needed to feed them. It's certain that this upped demand for electricity will be met. Reason: electric utilities are putting a major portion of their new generating plants on waterside sites in order to have access to water-borne coal for their generating plants. Supply of coal via the waterways is also assured as new coal mines are being opened along the rivers.

Negative Side: There are disadvantages to waterway shipping. Most important: the great capacities of the barges. A chemical company must ship in large quantities to take advantage of lower waterway rates. But, since most chemicals are shipped in great volume, the impact of this factor is not as strong as would be expected.

Some chemical companies complain that it generally takes longer to move freight by inland waterways. But spokesmen for Inland Waterways Common Carriers Assn. say this is not so.

Chemicals can be moved from New Orleans to Chicago, they point out, on the average of only five days downstream and 12 days upstream. With proper terminal facilities and scheduling, they say, this results in a smooth and quick distribution process.

Furthermore, states IWCCA, the inland waterways have not been hampered by labor difficulties that have plagued other means of transportation.

Inadequate lock systems and not-deep-enough channels are complaints by industries turning to waterway shipment.

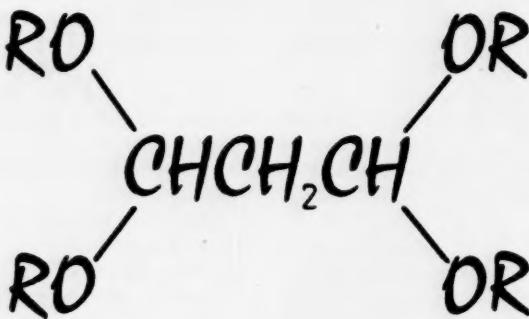
Many lock systems on the water routes are outdated. As horsepower of towboats is upped and as more barges are towed, delays at outmoded locks become more frequent. Also, river users would like all channels to be at least 12 ft. deep to handle larger barges, but they say that they would settle for standardization at a 9-ft. depth. (In '54, channels of some 48% of the navigable rivers were not even 9-ft. deep.)

Steps are being taken to relieve these bottlenecks. The Army's Corps of Engineers is constantly improving waterways. Channels are being deepened, locks being rebuilt and improved, and additional dams constructed for reliable operation. Re-

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JACK MACE is sales representative for the Du Pont Polychemicals Department in the Newark, New Jersey, area. He's a native of Cleveland, Ohio, and earned his Bachelor of Science degree

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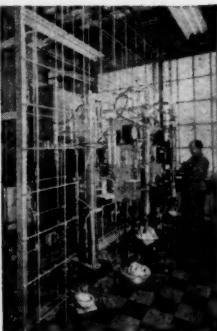
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SALES

cently, the Senate passed a bill authorizing construction of an \$88-million tidewater canal linking New Orleans with the Gulf of Mexico.

Improvement projects are either under way or completed on the Mississippi and the Columbia rivers.

Army engineers have deepened a 602-mile stretch of the turbulent Missouri River. By 1966, the river will be navigable up to Sioux City, and may well compete as an important chemical route.

Barging Ahead: Stepped-up requirements for chemical movement along the waterways have been a boon for barge owners—especially those catering to special chemical problems.

Most river-shipping equipment is privately owned or chartered. Stauffer, Dow, Monsanto, Olin Mathieson are some of the larger barge owners.

There seems to be no limit to the range of chemical products that can be shipped by barge—and no limit, either, to the type of barge that can be designed and built to meet a particular chemical-freight problem.

Most of these barges have been more or less standardized to fit locks 600x100 ft. Mississippi and Illinois River barges are generally 195x35x11 ft., with a capacity of about 1,400 tons. Ohio River barges are somewhat smaller, 175x26x11 ft., with about a 900-ton capacity.

While barge sizes generally run about the same, variations in design and construction are many; these are usually determined by the chemical cargo to be carried.

Here are a few examples of barges put on inland waterways within the last three years:

Dow's recently purchased barge, which carries cargo in six cylindrical tanks, is designed to transport safely and quickly three organic chemicals at one time. Some of the chemicals that have been moved in this barge: perchlorethylene, methyl chloride, carbon tetrachloride, ethylene, glycol, styrene.

One shipyard has built a 252-ft. barge with seven below-deck tanks and two above-deck tanks to haul 1,680 tons of anhydrous ammonia.

Another specially insulated barge can haul hot asphalt for long distances. How much? Enough, says the barge, to build a two-lane highway 20 miles long.

One well-known shipbuilder has constructed a unique pressurized barge



TITANIUM thermowell SAVES \$10,000

A thermowell, used in a chemical reaction vessel at DuPont, was failing about every nine months from severe corrosion, even when fabricated from one of the best of the standard corrosion-resistant metals. The environment was dilute nitric acid and nitrogen oxide at temperatures exceeding 400F.

Titanium was suggested as a material of construction. But, since such a unit would cost \$300 against \$95 for the existing installation, a careful total cost analysis was made. The findings were startling:

DuPont corrosion engineers discovered that each time a thermowell failed, it cost the company \$1500 in lost production and replacement labor. They estimated a service life for the titanium thermowell of at least five years (five to ten times as

long as the other corrosion resistant material) resulting in a saving of about \$10,000.

As this case history shows, titanium's corrosion-resistance often makes it by far the most economical material. Yet, this versatile metal offers additional outstanding advantages . . . each sufficiently important to recommend it to designers and engineers. For example, titanium is unusually resistant to erosion by high-velocity fluids and to stress-corrosion cracking . . . withstands abrasion, shock and fatigue . . . has a uniquely high strength-weight ratio that means substantial reduction in weight and cost of material needed for a given use.

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X **Injection Molders** are getting shorter cycles, complete control of flow, higher gloss, sure mold release, with the ability to mold larger and more intricate parts.

X **Polish Makers** use it in its emulsifiable form and call it the "Polish Maker's Polyethylene". They're getting finish durability, non-slip properties, and rebuffability!

X **Paper Converters** use it as a hot melt and are enthusiastic about the low-cost quality coating it offers. Grease resistance, scuff resistance and single feed to automatic machines are other advantages!

X **Dairy Carton Coaters** add it to waxes for their cartons, getting longer shelf life and reducing flaking, leaking and bulging!

X **Food Packagers** like the smarter, glossier appearance of their packages—less rub-off and scuff. Printing looks better, too!

X **Box Makers** coat interior surfaces of corrugated cartons with an A-C POLYETHYLENE-Paraffin blend to eliminate the need for liners! Scratch from paper fibers on fine finishes is eliminated!

X **Textile Finishers** find A-C POLYETHYLENE surprisingly versatile for sizes or finishes. Excellent hand, sewability, durability, abrasion resistance and many production advantages result from using this polymer!

X **Ink and Paint Manufacturers** are satisfied that A-C POLYETHYLENE adds anti-smudge and scuff resistance characteristics to their products!

X **Slush Molders** use A-C POLYETHYLENE with other polyethylenes and end up with a "brand new" material, giving them simpler production with lowest mold costs. The finished articles are tough, colorful and have fine detail!

X **Film Extruders** are using A-C POLYETHYLENE for faster extrusion rates, lower machine temperatures, easier gauge control and less all around machine stress. A-C POLYETHYLENE is a natural for coloring films. Color concentrates made with A-C POLYETHYLENE produce brilliant, uniformly colored film!

X **Squeeze Bottle Makers** are praising the glossy finish and even color when using A-C POLYETHYLENE. They like the faster molding operation, too!

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SALES

for hauling propane. The gas is carried in nine cylindrical high-pressure tanks. These tanks are cradled horizontally in a typical hopper barge with six tanks in the hopper and three tanks "piggybacked." Because of the low density of propane, the saddling arrangement permits the use of a smaller 500-ton-capacity barge.

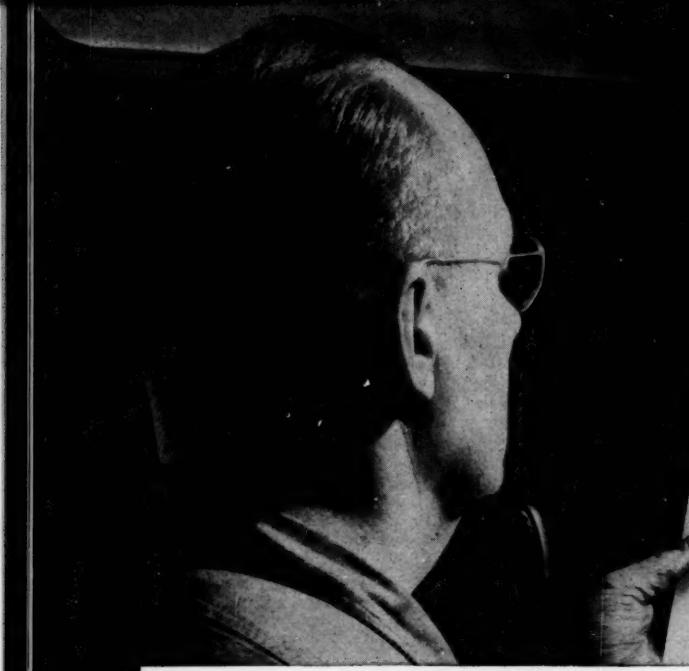
Special "thermos bottle" barges have been developed for transporting molten sulfur from the mine to the processing mills. The trend of moving sulfur in the liquid state has been growing steadily since the Korean War, is expected to become standard practice in most areas by 1960.

Use of these barges by Freeport Sulphur offers a striking example of how these specially designed haulers can cut costs and handling charges. A little more than a year ago, the firm had been loading dry sulfur at Freeport and shipping it to St. Louis. There the sulfur was once again restored to its molten state. However, last year, thanks to the new foam-glass insulated barges, the sulfur was shipped to St. Louis in its liquid state. Since the chemical is mined as a liquid and used by the St. Louis purchaser in this form, it's apparent why these new barges are cutting shipping costs.

Meanwhile, tests are currently being conducted for the construction of a methane-carrying barge. Tough problem now being met: keeping the methane in a liquid state under very low temperatures while the chemical is being transported.

To keep pace with the modernization of the barge industry, towboats are also becoming specialized. Tows now vary from 800 to 5,400 hp., and from single screw to quadruple screw for added thrust. Radar is standard equipment on many tows, as are ship-to-shore telephones, gyroscopes, and short- and long-wavelength radios. Continuing research in barge and tow improvement is being conducted by such institutes as the Stevens Institute of Technology (Hoboken, N.J.). Some barge and towboat builders, such as Dravo, have set up their own research centers.

Thus, shipping and expansion activities along the nation's inland waterways are expected to continue at a brisk pace. And it's a safe bet that the chemical industry will play an even greater role in this movement than ever before.



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you get a smoother, glossier
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In coated papers, gloss, smoothness, and wet-rub resistance of the finished paper affect the quality of the printing. Now, all three have been improved substantially by a new, *fortified* styrene-butadiene latex developed by Koppers. This new latex, called DYLEX K-52, has a much smaller particle size than typical styrene-butadiene latices. As a result, it has improved pigment binding strength and good adhesion and flow properties. Used either alone or in combination with natural adhesives and clays, DYLEX K-52 promises substantial improvement in printability of coated papers.

Water-base paints, too, are being improved with a new, *fortified* Koppers latex. This latex, called DYLEX K-34, gives paint better adhesion, stain removal, freeze-thaw stability, color development, and storage stability. DYLEX K-34 provides excellent scrub resistance and can be used in combination with other latices and resins.

Latices are just one group of chemicals that Koppers makes and is constantly striving to improve. Write for a description of the many other useful synthetic chemicals made by Koppers. Koppers Company, Inc., Chemical Division, Dept. CW-87, Pittsburgh 19, Pennsylvania.

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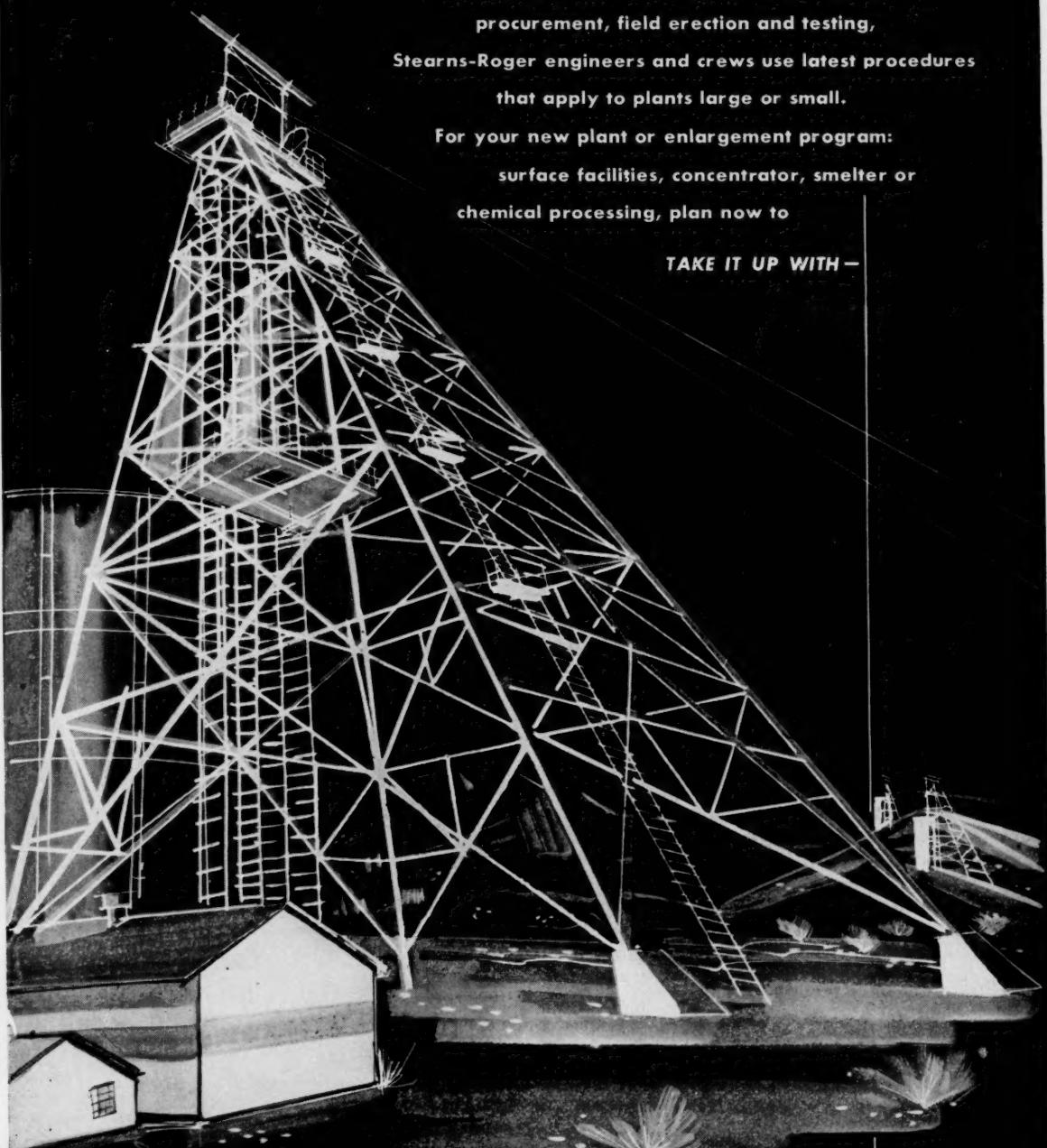
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Market Newsletter

CHEMICAL WEEK
August 31, 1957

Will 1957's last quarter bring another wave of price-hikes?

Whether the '56 price pattern will repeat is still speculative, of course, but this week a number of producers are posting advances with Oct. 1 as the effective date.

Contract customers of phenol and maleic anhydride, for example, will pay $\frac{1}{4}$ ¢/lb. more for their needs, come October. (Spot purchase prices went up Monday.) Prime factor behind the increases on both chemicals: railroad freight increases.

On phenol, tankcar and tanktruck tags move to $18\frac{1}{4}$ ¢/lb., while c.l. and t.l. price for the material, packed in 55-gal. drums, will be $20\frac{1}{4}$ ¢/lb.

Phenol demand hasn't been too brisk of late, but marketers expect business to pick up somewhat within the next few weeks. There's no near-future threat of shortages, though; stocks on hand are more than ample to cover anticipated requirements. It's a switch from the tight supply situation some users faced late last year.

Higher prices on maleic anhydride include a c.l. and t.l. drum tag of $28\frac{3}{4}$ ¢/lb., and, on lesser quantities, $29\frac{3}{4}$ ¢/lb. for deliveries east of the Rockies; and $1\frac{1}{2}$ ¢/lb. for shipments west of the Rockies. Quotes are f.o.b. works, minimum freight allowed to all parts of the U.S.

Maleic demand at the moment, unlike that for phenol, is described as "fairly good," with particular emphasis coming from requirements for polyester production.

The freight rise also prompted Dow's tilting up the prices on 18 industrial chemicals. The new price hikes, ranging from $\frac{1}{4}$ ¢/lb. on bulk shipments to $\frac{1}{2}$ ¢/lb. on l.c.l. orders, are also effective Aug. 26. Says the company: "The increases resulted from Dow's absorbing cumulative freight-rate boosts on incoming raw materials as well as outgoing finished products."

The items affected: aspirin, methyl salicylate, sodium salicylate, salicylic acid, *o*-chloro-*p*-nitro aniline, *p*-chloro-*o*-nitro aniline, monochlorobenzene, *o*-dichlorobenzene, trichlorobenzene, and nine xanthates.

All shipments of dynel fiber will cost more as of Oct. 1, says Union Carbide. The announcement, by H. M. West, manager of the firm's textile fibers department, lists a 5¢/lb. increase (to \$1.10) on natural dynel in 3-, 6- and 12-denier staple and tow. (Unchanged is 24-denier at \$1.05/lb.) Dynel spun with color goes up 10¢/lb. Prices are f.o.b. South Charleston, W. Va.

When queried as to why the increase (since acrylic fiber output

Market Newsletter

(Continued)

in the U.S. is definitely on the upswing), Carbide echoed the familiar—though hard-to-discount—plaint: an attempt to compensate for rising manufacturing costs.

That copper prices would drop to lower levels was clear a couple of weeks ago (*CW Market Newsletter, Aug. 17*), but that domestic custom smelters would apply two $1\frac{1}{2}$ ¢/lb. slashes in two days (as they did late last week) came somewhat as a surprise to the trade.

The smelters reportedly were having trouble moving any material at $28\frac{1}{4}$ ¢/lb. (which was only $\frac{1}{4}$ ¢ lower than major producers' prices), and this led to the first cut. The second $\frac{1}{2}$ ¢ chop followed a drop in Belgian copper quotes and the release of Copper Institute statistics showing that consumption and new sales in the U.S. were down sharply.

Some copper observers aren't certain the lower $27\frac{1}{4}$ ¢ tag will spur buying of the metal, candidly admit it may take another hefty cut to jog consumers.

Copper chemicals continue to feel the impact of the soft metal market. Latest to skid: black copper oxide. Producers have sliced $\frac{3}{4}$ ¢/lb. off quotations, established a new c.l. price of $44\frac{1}{4}$ ¢. Price for less than a ton is now $46\frac{1}{4}$ ¢/lb.

Incidentally, copper hydrate, reported at $48\frac{3}{4}$ ¢/lb. (c.l.) (*CW Market Newsletter, Aug. 17*)—following a $\frac{1}{4}$ ¢/lb. decline—should have been listed at $49\frac{1}{2}$ ¢. The lesser tag, however, may well become valid if price quotations of primary copper producers—on which hydrate prices are based—weaken, as have custom smelters' prices.

Cylinder prices on anhydrous ammonia will go up about $1\frac{1}{2}$ ¢/lb. on Oct. 1. The changes, posted by Allied Chemical's Nitrogen Division, are the first in several years, come as a result of "higher tankcar prices, freight and distribution costs."

Representative new tags: In the New England states (except Maine), middle Atlantic states, Maryland, Virginia, and North Carolina, the material goes up to 20¢/lb. (in Maine 21¢).

SELECTED PRICE CHANGES—Week Ending Aug. 26, 1957

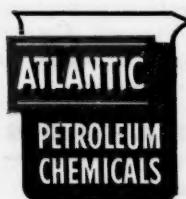
	Change	New Price
UP		
Adipic acid, 50 lb. bgs., c.l., t.l.	\$0.0025	\$0.3225
Methyl salicylate, USP, cns., 500 lb. lots	0.005	0.625
Oxalic acid, bbls., c.l., wks.,	0.02	0.185
Salicylic acid, USP, cryst., 100 lb. fib. dms., 1,000 lbs. or more	0.005	0.525

All prices per pound unless quantity is stated.

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The Ultrawets are only one member of the Atlantic family of petrochemicals (so you see a miniature oil refinery in the picture). Many new and profitable uses for these versatile Atlantic petrochemicals are constantly being applied in cost-cutting processes, in the development of new products and the improvement of well-established brands. For further information on Atlantic petrochemicals and service, write or wire The Atlantic Refining Company, Dept. H-8, at the nearest office listed below.



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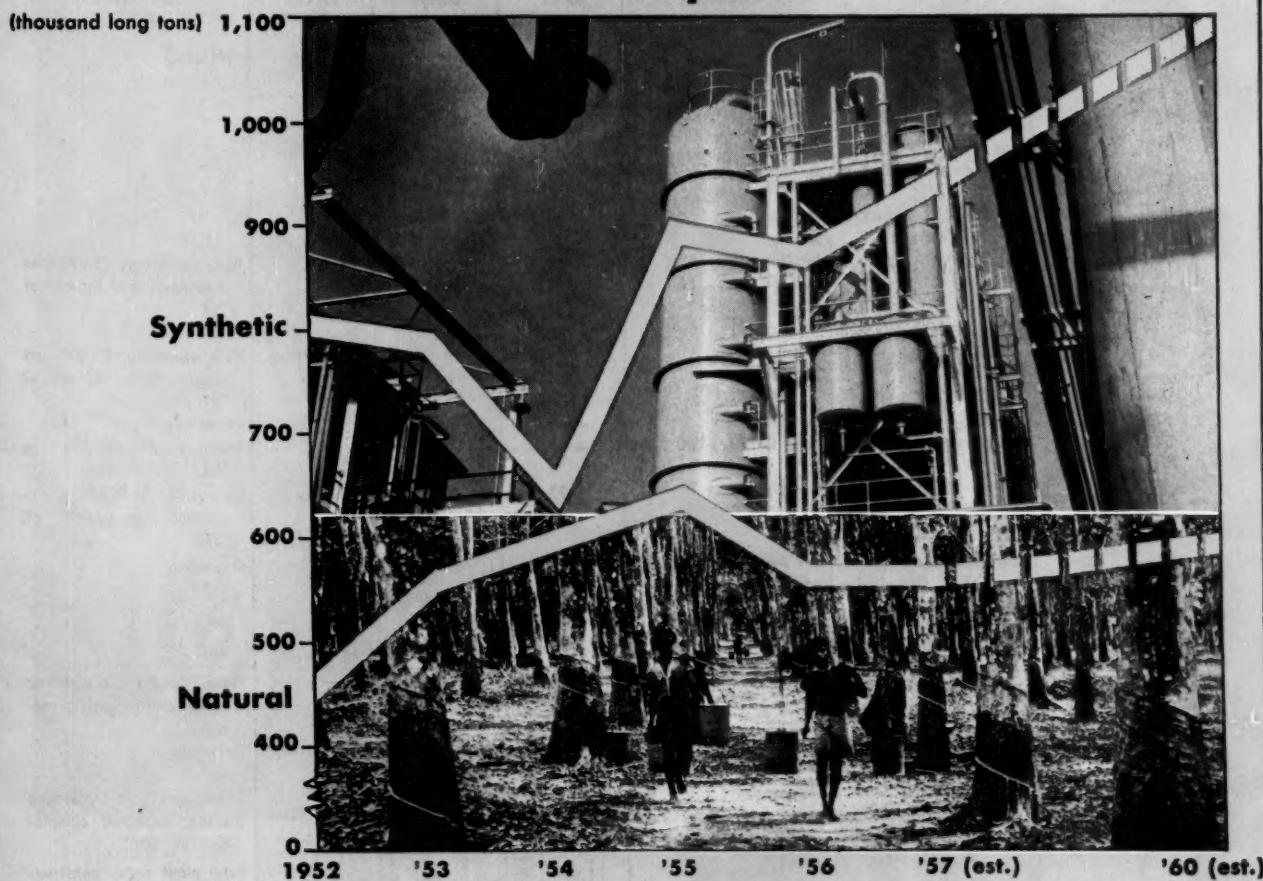
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5308-B

MARKETS

U.S. Rubber Consumption



Natural-Synthetic Battle Due to Warm Up

The natural rubber industry's attempts to combat inroads of synthetic material thus far have been lukewarm. But this week, a still-not-generally circulated British report promises to heat the natural-synthetic battle to a fever pitch.

The blueprint for action calls on the natural rubber industry to ape many of the practices now being effectively used by its chief competitor—the U.S. synthetic rubber industry.

Somewhat belated recognition that synthetics (rubbers and plastic specialty products) were no longer "mere substitutes" for natural rubber, led the natural rubber producing industry of Britain and Malaya to seek an impartial appraisal of the industry's current

efforts in meeting competition, and a course of action for the future. For the appraisal, it retained Oxford University Professor E. G. Blackman. The six-man Blackman Commission—more formally called the "Advisory Committee Enquiring into Production Development and Consumption Research in the Natural Rubber Industry"—critically examined the industry's performance, outlined steps to help natural rubber "survive as a strong industry."

Plan of Action: Among the proposals:

- An intensified better coordinated research program (including basic and applied research), geared to the single goal of "commercial exploitation" of

research results. (The commission found too many research projects that, even if successful, were of no potential value in expanding the market for natural rubber.)

- Abandon the idea that natural rubber is a "superior product" and that touting it as such to the public—the ultimate consumer of rubber products—would rout its synthetic opposition from the market. Instead, the committee urges natural producers not to revive mass-media consumer advertising, particularly in the big U.S. market, concentrate on wooing manufacturers of rubber goods. Keystone of this effort should be development of specialty rubber, general improvement of rubber quality, better market

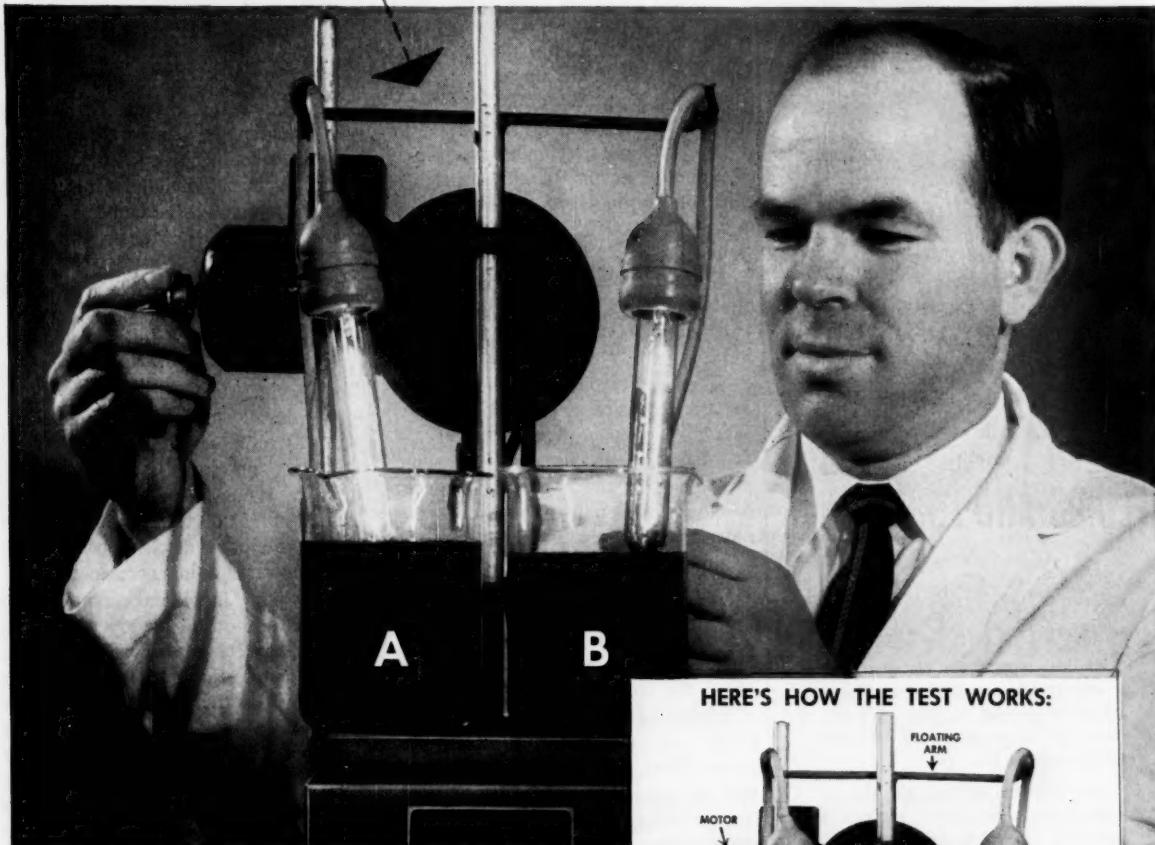
M A R K E T S

Principal Synthetic Rubber Plants in the Free World

Country	Company	Plant Location	Est. Capacity (thousand long tons)	GRS	Butyl	Other	Remarks
U. S.	American Synthetic Rubber	Louisville	68	—	—	—	Operating
	Copolymer Rubber and Chemical	Baton Rouge	75	—	—	—	"
	Du Pont	Louisville	—	—	125	—	"
	Esso	Baton Rouge	—	47	—	—	"
	Firestone Tire & Rubber	Akron	40	—	—	—	"
	General Tire & Rubber	Lake Charles, La.	190	—	—	—	"
	Goodrich Rubber	Odessa, Tex.	40	—	—	—	"
	Goodrich-Gulf	Akron	—	—	35 (nitrile)	—	"
	Goodyear Synthetic Rubber	Institute, W. Va.	122	—	—	—	Both operating; 25,000-tons expansion due by end of '57.
		Port Neches, Tex.	95	—	—	—	
		Akron	15	—	15 (nitrile)	—	Both operating; 80,000-tons expansion due by end of '57.
		Houston	145	—	—	—	
	Humble Petroleum Chemicals	Baytown, Tex.	—	43	—	—	Operating
		Lake Charles, La.	—	30	—	—	Under construction; due in '58.
	Phillips Chemical	Borger, Tex.	72	—	—	—	Operating; 58,000-tons expansion due by end of '57.
	Shell Chemical	Los Angeles	126	—	—	—	Operating
	Texas-U. S. Chemical	Port Neches, Tex.	135	—	—	—	"
	United Rubber and Chemical	Baytown, Tex.	68	—	—	—	"
	United States Rubber	Naugatuck, Conn.	30	—	—	15 (nitrile)	"
Brazil	—	São Paulo	not available	—	—	—	Plans under discussion; early realization uncertain.
Canada	Polymer Corp.	Sarnia	100	30	25 (nitrile)	—	Operating
France	Societe du Caoutchouc	Le Havre	50	20	—	—	GRS plant in planning stage; expected completion in '60. Butyl plant under construction; completion mid-'58.
Holland	Shell	Pernis	n.a.	—	—	—	In planning stage.
India	Government-sponsored	Uttar Pradesh	20	—	—	—	In planning stage; completion within five years.
Italy	Ente Nazionale Idrocarburi	Ravenna	30	—	—	—	Under construction; completion in '59.
Japan	Japan Synthetic Rubber Industry Co.	Yokkaichi	35	—	—	—	In planning stage.
Spain	Government-sponsored	Miranda de Ebro	n.a.	—	—	—	In planning stage.
United Kingdom	Imperial Chemical Industries	Wilton	10	—	—	—	Nearing completion.
	International Synthetic Rubber	Fawley	50	—	—	—	Under construction; completion in '58.
	Dunlop Rubber	Fort Dunlop	2	—	—	—	Operating; semicommercial plant.
	British-Geon Ltd.	Barry	—	—	n.a. (nitrile)	—	Under construction; completion in '58.
	Du Pont	Londonderry	—	—	n.a. (neoprene)	—	In planning stage.
West Germany	Chemische Werke Hüls	Marl	10	—	—	—	Operating
	Buna Werke Hüls (Bayer, Hoechst, Badische)	Marl	45	—	—	—	Under construction; completion in '58.

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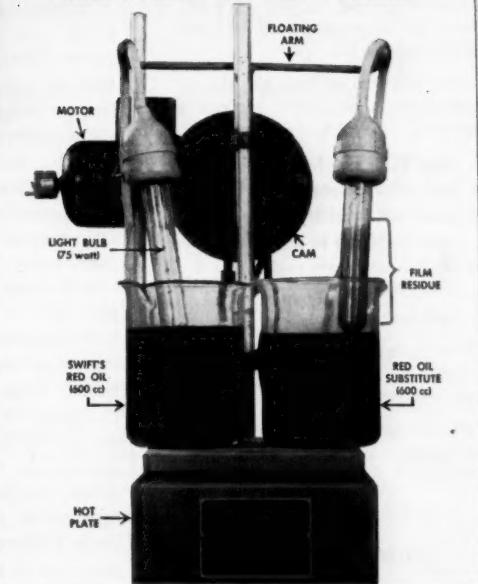
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August 31, 1957 • Chemical Week



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M A R K E T S

ing practices, and establishment of a technical advisory service to prospective customers.

• Aim for lower and more stable prices. Research and development, says the commission, "will be of no avail in meeting the threat from synthetic rubber unless these efforts can be translated into the production of natural rubber at a competitive price." The industry's aim should be production of good-quality natural rubber selling for about 20% less than present prices.

Natural rubber now brings a premium of 8-9¢/lb. over synthetics in supplying 25-33% of the U.S. market for which no feasible synthetic products are available. From inquiries made in America, the committee notes that synthetics have a technical advantage in approximately the same proportion of the market. Possession of the remainder of the market at any particular time is dependent on the relative price.

Price of synthetic has been remarkably steady over the years. Price of GR-S* (the first mass-produced synthetic), for example, has stayed at about the same level (23¢/lb.) it was at when the Reconstruction Finance Corp. ran the government rubber plants. This, despite the wide belief that private industry would be forced to raise prices when it took over synthetic rubber production.

U.S. Emulsion: The Blackman group believes it reasonable that the same trends evident in the U.S.—i.e., encroachment of synthetics into once exclusively held natural outlets—will develop elsewhere (see table†, p. 110).

Until now, U.S. exports have been the prime source for foreign synthetic rubber consumers, but the situation is changing. In Europe, in the Far East and in South America, plants for the production of synthetics (SBR, butyl, nitrile, neoprene) are under construction or in the planning stage. And these facilities will hurdle the greatest obstacles to wider world consumption of synthetics—availability. But it will be some time before natural rubber relinquishes its major share (62%) of the world rubber market.

Except for the Polymer Corp. plants in Sarnia, Can., and comparatively small installations in England

*Government Rubber-Styrene; newer trade designation, Styrene-Butadiene Rubber (SBR).

†Compiled by Chemical Projects Associates, New York City.

and West Germany (and excluding the U.S., of course), most free-world synthetic units won't be operating until '58 or later.

Interesting sidelight to the foreign rubber picture is the push synthetic is receiving from governments. In Japan, for instance, a firm recently organized with government support, Japan Synthetic Rubber Industry Co., will supplant various individual projects previously planned by a number of chemical, rubber and petroleum companies (CW, Feb. 23, p. 100).

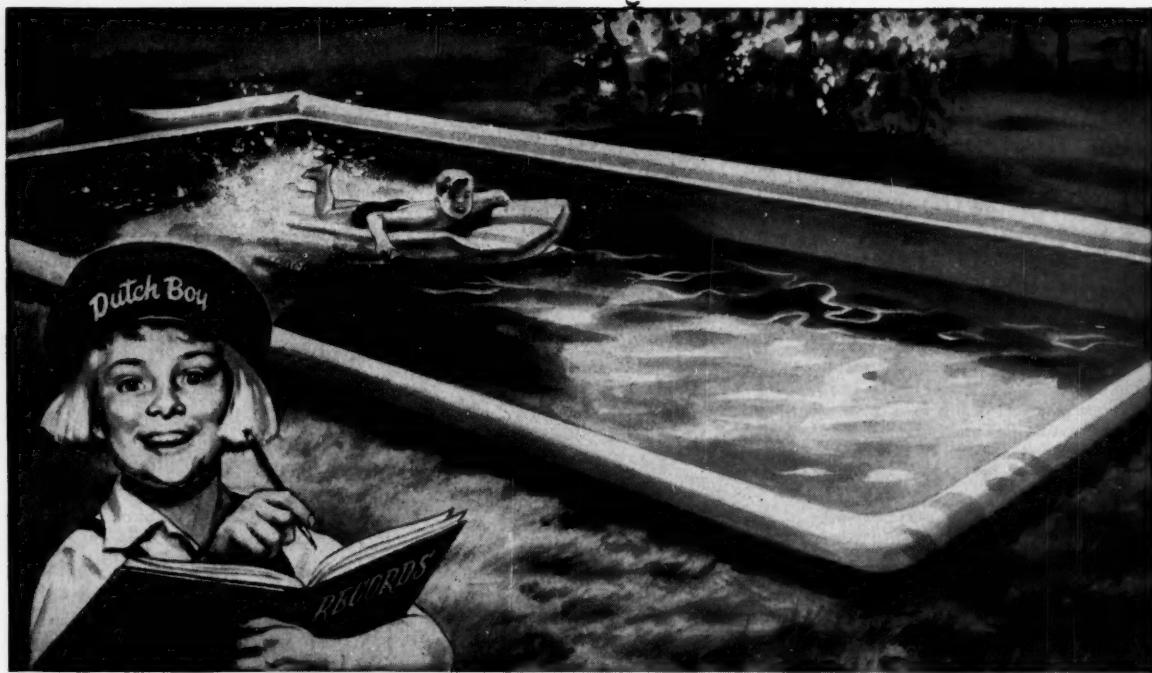
Not included in the list of foreign synthetic installations, but nonetheless indicative of the man-made rubber's growing importance, are reports out of the Soviet zone of Germany. The "German Democratic Republic" is said to have set a goal of 100,000 tons/year of synthetic rubber production by 1960. In '55, output was reported at 73,000 tons, with most of it being produced at Schkopau, where new units are being constructed.

How long it will take synthetic to push natural out of the top spot as the world market supplier is, of course, moot. But it didn't take too long for the switch in the U.S. When synthetic production was under government aegis, natural rubber was given first call on U.S. markets. Synthetic was relegated to a supplementary role, with production controlled to plug the gap between total rubber demand and availability of the natural product (after meeting stockpiling needs).

But soaring requirements, plus fluctuating price and insufficient supply of natural rubber, soon combined to push synthetic consumption to almost double that of natural. The acquisition of the synthetic industry by private owners completed the reversal of roles, and consumption of synthetic rubber in the U.S. has climbed steadily.

Note this pattern of progress in synthetic's share of the total U.S. market: in '55, some 58% of the rubber consumed in this country was synthetic; last year, it was about 61%. This year, synthetic use is expected to hike up to about 940,000 long tons (approximately 63%), compared with natural consumption of 560,000 tons. By '60, the score may be 1,090,000 tons (65%) vs. 590,000 of natural.

The implication, if the U.S. pattern is an indication, that natural may fast become the world's "supplementary" rubber, is not lost on natural pro-



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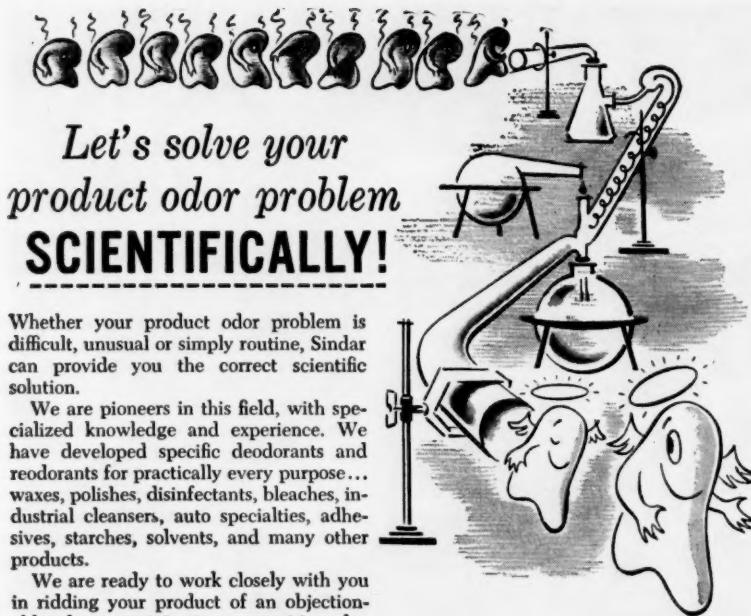
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MARKETS

ducers. The handwriting on the wall is apparently more than legible to the advisory committee, and it makes the point plain in this statement of strong advice to its sponsoring industry: "If this competition (from synthetic) is to be met by natural rubber and if the share of the market is not to dwindle over the years, it is imperative in the first place that the price of natural rubber should be low enough to ensure that it will be preferred to possible alternative materials.

"Second, the supplies reaching the manufacturers should be of a form and quality which best meet their requirements. Third, every endeavor should be made to exploit to the full the properties of natural rubber. Fourth, efforts should be intensified to rectify, as far as possible, its known shortcomings."

The competition between synthetic and natural is not confined to price and availability; quality and suitability for specific uses—results of intensive technological research—have become potent selling points, particularly for synthetic. One of the unique properties of natural rubber is the small amount of heat generated when the material is flexed; that property is why natural has held a pre-eminent position in the manufacture of truck tires.

But early last week, the Department of the Army disclosed that all-butyl synthetic tires had passed rigid Army tests. Later in the week, Firestone Tire & Rubber announced that it had presented its version of a synthetic tire to U.S. Army Ordnance. The latter is made of Coral (polyisoprene), a synthetic said to have essentially the same molecular structure as natural rubber. These synthetic tires have been pronounced as equal to or better than those made of natural rubber.

There are now literally dozens of categories of synthetic rubber, and more can be actually "tailor-made" for specific uses.

Thus, on three important counts—price, availability, suitability—synthetic rubber has topped the natural product—at least in the U.S. Whether or not the natural rubber industry's appraisal can slow down a similar situation on world markets is still a question for the future. But this much is certain: the commission's study—and advice—comes not a moment too soon.

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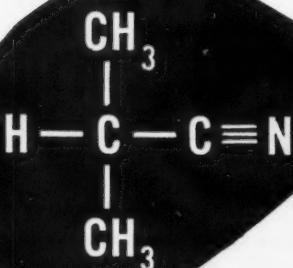
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Isobutyronitrile Specifications:

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Isobutyronitrile is only one of a versatile family of compounds derived from isobutyraldehyde. Other derivatives of this Eastman building block are isobutyl alcohol, isobutyric acid, neopentyl glycol and 2, 2, 4 trimethyl-1, 3-pentanediol. Isobutyraldehyde and its derivatives are useful in themselves or as starting materials in the production of solvents, plasticizers, pharmaceuticals, polymer intermediates, resins, insecticides, hydraulic fluids and lubricants.

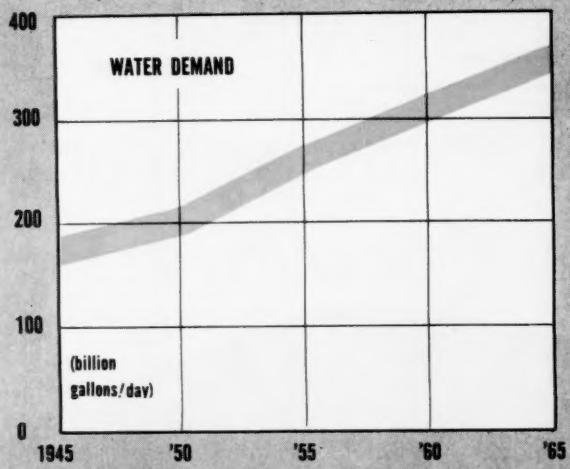
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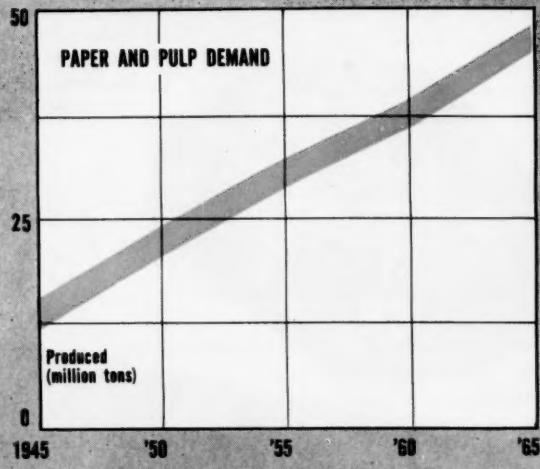
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Climbing U. S. Water Requirements, and Expanding Pulp and Paper Needs

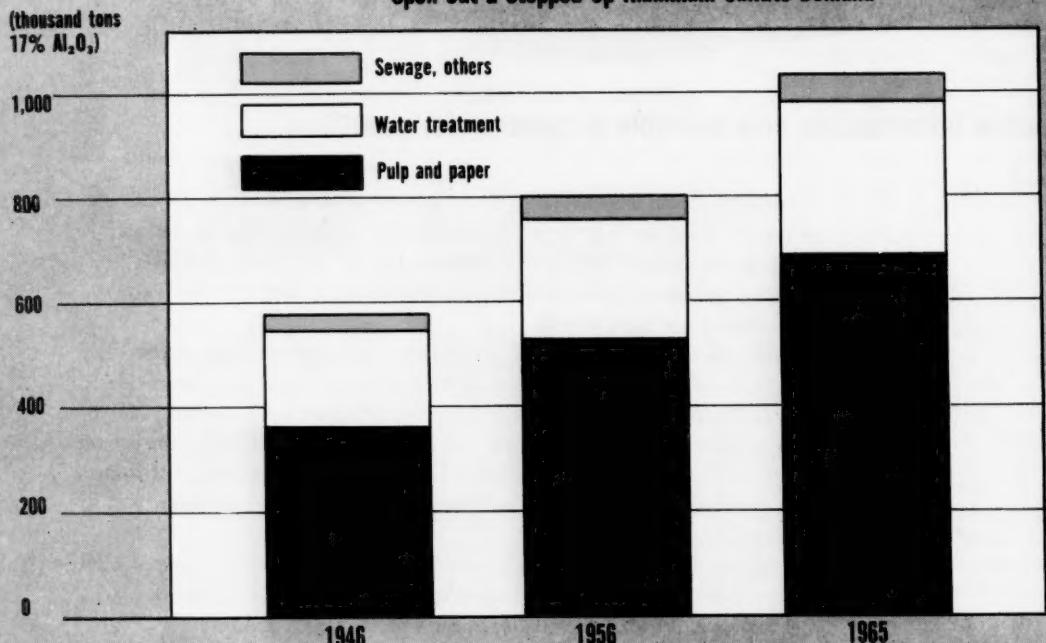


Source: U.S. Dept. of Commerce.



Source: U.S. Dept. of Commerce.

Spell Out a Stepped-Up Aluminum Sulfate Demand



Alum Demand Steps up to a Million

Surging demand by the paper and pulp industry and increased consumption of water are the forces that could send commercial-grade aluminum sulfate usage soaring to more than 1 million tons/year by 1965. That's a healthy 25% jump since '56, when demand for this chemical reached a record 800,000 tons. Compare

'46's consumption of aluminum sulfate (about 580,000 tons) with '65's forecast, and you have a whacking 72% growth within two decades.

It's apparent that the industry is already preparing for sizable future demands. The prospects are underscored by these recent developments:

- Startup of American Cyanamid's

new aluminum sulfate plant at Cloquet, Minn.

- Startup of General Chemical's spanking-new installation at Port St. Joe, Fla.

- General Chemical's disclosure that it plans to build a plant at Pine Bluff, Ark., to supply local paper mills. (This will bring the number of



*A few gallons
of vinyl resin coating give...*

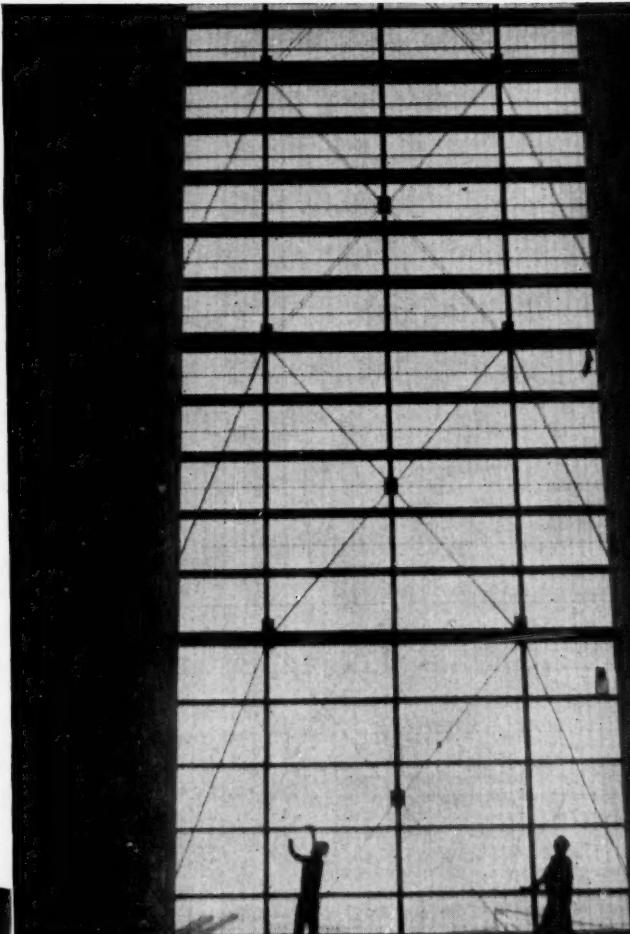
protection from tons of surging water

When The Dalles Dam on the Columbia River in Oregon is completed by the U. S. Army's Corps of Engineers, millions of tons of water will rush through openings like the one shown at the right to operate huge turbines.

The grille-like coverings prevent debris from getting to the delicate turbine blades. The terrific friction between rushing water and the steel structures would destroy any ordinary paint. Yet in spite of this erosive action, coatings of vinyl resins were specified . . . based on years of experience with similar applications. BAKELITE Brand Vinyl Resins satisfied this specification in every respect.

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Below: the exterior of The Dalles Dam with the trash racks partially installed. This is only part of the millions of square feet of steel that will be under water or intermittently wet and dry.

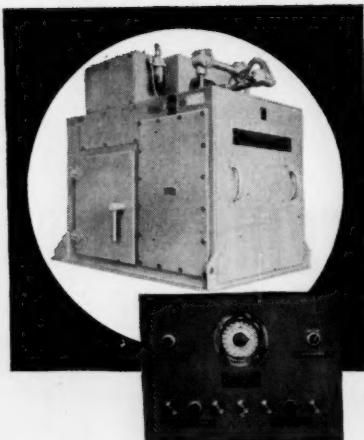


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MARKETS

General Chemical aluminum sulfate plants to 25.)

The industry, in general, isn't too enthusiastic about tallying total domestic capacity for making aluminum sulfate; spokesmen say merely that it's a good 25% more than actual production. "Demand for our product is restricted to localized areas; it isn't economically feasible to ship it any great distance. We're more concerned with capacity of plants within our area of operations than with what's cooking a couple of hundred miles from here," says one major producer.

This explains why there are numerous small plants scattered through all parts of the U.S. One important factor that determines location of an aluminum sulfate plant is the nearness of pulp and paper producing facilities.

Paper Sets the Pace: The pulp and paper industry, voracious consumer of chemicals, uses up about two-thirds of the available aluminum sulfate. By '65, demand for the commercial grade by these customers should easily hit somewhere near 700,000 tons — a healthy 33% hike over '56's consumption (525,000 tons) and a soaring 95% pickup over '46 usage (360,000 tons).

Aluminum sulfate plays two important parts in pulp and paper manufacture. It's a precipitant of rosins used in sizing paper. The size renders paper impermeable to fluids and determines, to an extent, the paper's suitability for printing, writing or wrapping, etc. Sizing operations alone indicate the alum's dependency on the paper industry. About 80% of the sulfate sold channels into sizing processes.

Secondary role played by aluminum sulfate in the industry is as a coagulant in the primary treatment of water consumed in manufacturing pulp and paper. Raw water usually contains suspended particles that interfere with production. Coagulation removes most of these contaminants. Although this outlet now takes some 20% of total aluminum sulfate consumed by the industry, the percentage should increase as paper producers find it more necessary to tap turbid waters for their supply.

Several months ago, pessimism concerning outlook for pulp and paper — and, concomitantly, alum — was fairly general. One particularly dire prediction: heavy expansion plans

within the industry would soon greatly overshadow demand. The paperboard segment of the industry was cited as an example. Last year, output of paperboard reached an all-time high of 14.4 million tons; orders lagged behind by a slim, though not worrisome, 15,000 tons. Then, during the first half of '57, production slipped 4.9% under that of the same period in '56. During the last half of '57, though, a noticeable pickup in paperboard production (because of brisker demand) brightened the outlook. Consequently, plans are being readied to boost capacity an additional 11% within the next two years.

Top paper producer, International Paper, has blueprinted a \$57-million pulp and paper mill in Pine Bluff, Ark. Bowater Carolina has tentatively scheduled plans for a \$35-million kraft pulp mill, and Crown Zellerbach is said to be considering building an \$8-million tissue-producing installation and a \$3-million kraft bleaching plant.

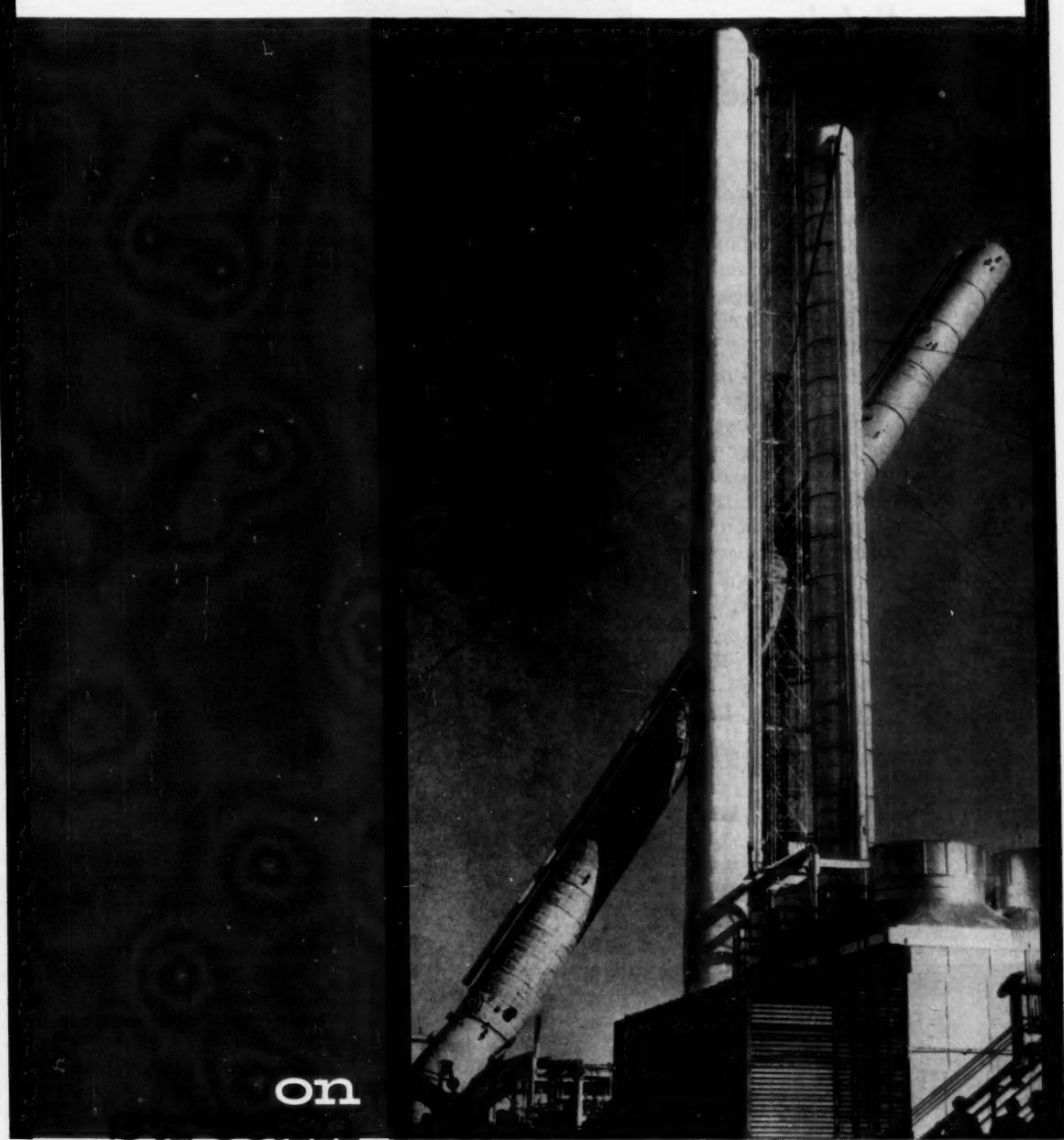
The recently released "Pulp, Paper and Board Supply/Demand Report" by the U.S. Dept. of Commerce has helped bolster a rather optimistic long-range outlook for the industry. The report indicates that, by '65, total paper and board demand will be 40% higher than in '56 — 43.6 million tons vs. 31.3 million tons. The government survey goes well beyond the conservative estimates by Stanford Research Institute's June '54 forecast of pulp and paperboard demand. SRI estimated that the demand by '65 would be about 37 million tons, some 6.6 million tons less than the government's prediction.

High Water Mark: Second among big consumers of aluminum sulfate are water users. By '65, the use of aluminum sulfate in treating industrial and municipal waters (excluding the estimated 140,000 tons used in water treatment by the paper industry) will hover at 290,000 tons. Last year, consumption was estimated at closer to 230,000 tons, considerably higher than the 185,000 tons used about a decade ago. Thus, within two decades, demand for aluminum sulfate by water users will have grown well over 56%.

Behind this heady growth is surging consumption of water by industry and municipalities. Both are concerned over dwindling supplies. And it would

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Three towers in series, each 200 feet in height, make up a 600 foot fractionating column in which ethylbenzene recovery takes place... the key to a new source of styrene for American industry.

Styrene is one of the many petro-chemicals available today from Cosden Petroleum Corporation, one of the world's largest independent inland refineries.



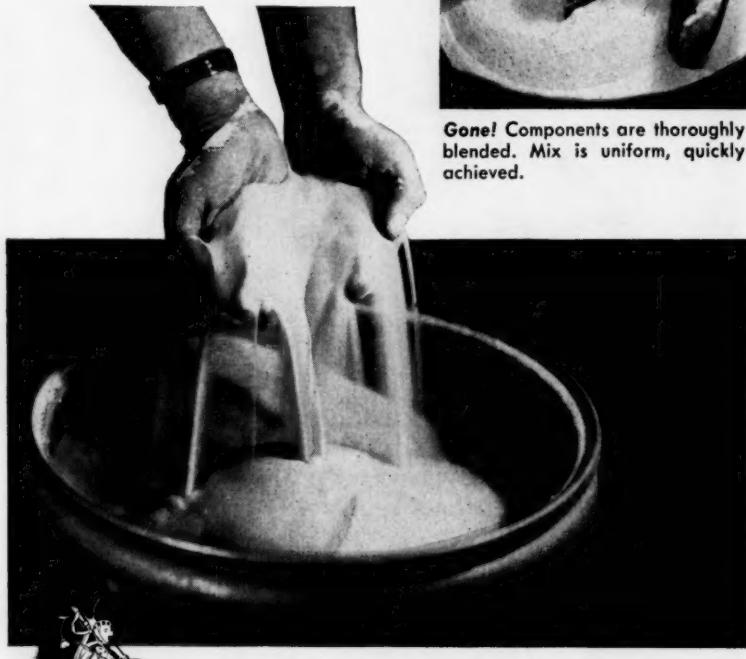
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Controlled dispersion for better blends:

If you're coating a fine, dry material; blending liquids into a dry powder . . . or dispersing a small amount of one material into another you need more than a simple stirring, tumbling or agitating action to achieve the desired results.

In the Simpson Mix-Muller a *three-way* kneading, smearing, spatulate action actually coats one material with another—rather than placing them *next* to each other. Agglomerates are broken up, moisture or binder dispersion is thorough. You get an intensive, homogenous mix that *stays* mixed and will not segregate in storage or transit. Want proof? Write for details on a confidential test. See what *mulling* can do and remember . . .

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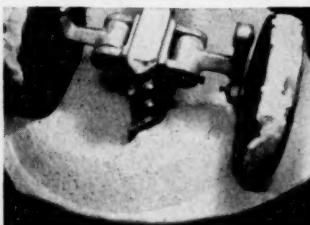
3 WAY ACTION saves time and reprocessing



after liquid addition mix is lumpy.



Going! Agglomerates start to respond to kneading, spatulate action.



Gone! Components are thoroughly blended. Mix is uniform, quickly achieved.

MARKETS

appear that the problem will become still more acute. A Dept. of Commerce report predicts that, by '65, domestic water demand will easily hit 360 billion gal./day, a 100% jump over '45 consumption of about 175 billion gal./day.

The report highlights several interesting facts:

- The population serviced by public water suppliers is expected to grow from 111 million in '55 to about 127 million in '65. The increase will send water needs soaring. Consumption of water on a daily average basis is expected to jump from 17 billion gal. in '55 to 25 billion by '65.

- Industries using their own water supplies are expected to hike daily total consumption a good 48% higher in '65 than in '55, 88 billion gal. vs. 60 billion.

- Increased water requirements for steam electric power, reflecting growing industrialization, is expected to swell from 60 billion gal./day in '55 to 92 billion gal./day in the 10-year period.

Recent drought and water shortages that have plagued the nation the past few years have intensified industries' concern over shrinking water supplies. Conservation of water and the quest for new sources are important steps being taken.

But it appears certain that turbid sources will be further tapped to meet growing demand; and the work horse in making this water usable will, of course, be aluminum sulfate.

Small, but Steady: Smaller outlets for aluminum sulfate are numerous. Among them is the sewage industry, which takes most of the 5% of the sulfate consumed by the second-line users.

Trade followers expect very little change, percentagewise, in demand in the next few years. By '65, these minor outlets should be taking close to 50,000 tons, with sewage treatment requiring about 30,000 tons of that. Last year, the sewage industry bought an estimated 25,000 tons of the coagulant, while other consumers (i.e., ceramics, aluminum salts, the petroleum industry, rubber latex, printing inks) took a scant 10,000 tons.

All things considered, it's apparent that aluminum sulfate producers will continue to look to paper and pulp and water treatment for the lion's share of future business.

BRIEFS

for buyers of

Phosphorus Chlorides

Solvents

Other Chemicals



New 12-page bulletin lists Hooker products

You'll find a complete up-to-the-minute listing of Hooker chemicals in this new 12-page bulletin.

Indexed for ready reference, it lists the chemicals you can buy from us in commercial quantity, including chemicals sold under the NIALK® and OLD-BURY® brand names.

Under each product you'll find a short description and condensed listing of properties, actual and suggested uses, and shipping containers. The bulletin also sums up for you the major types of processing performed at Hooker.

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Phosphorus chlorides: handle with care

Two chemicals that require very special handling are *phosphorus oxychloride*, POCl_3 , and *phosphorus trichloride*, PCl_3 .

Both are shipped, as a rule, in lead-lined tank cars.

If you buy either, be sure your supplier has what it takes to get the material to you promptly.

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For contract information, write us. For technical data sheets, just check the coupon.

Solvent	Formula	Hooker specifications		
		Freezing Point	Dist. Range	Sp. Gr.
Cyclohexanol: high grade tech. grade*	$\text{C}_6\text{H}_{11}\text{OH}$	18°C min. -10°C max.	100% within 159° to 163°C 85% within 1.5°C incl. 161.7°C	$0.944 \pm .0015^{\circ}$ $0.939 \pm .0015^{\circ}$
ortho-Dichlorobenzene	$\text{C}_6\text{H}_4\text{Cl}_2$	-18°C max.†	4°C incl. 179.5°C	$1.313 \pm .003^{\circ}\ddagger$
Methyl Cyclohexanol	$\text{CH}_3\text{C}_6\text{H}_{10}\text{OH}$	Note‡	155° to 180°C	$0.924 \pm .003^{\circ}\ddagger$
Monochlorobenzene	$\text{C}_6\text{H}_5\text{Cl}$	-44°C (typical)	1.0°C incl. 132.0°C	$1.113 \pm .001^{\circ}\ddagger$
Monochlorotoluene	$\text{CH}_3\text{C}_6\text{H}_4\text{Cl}$	-28°C† (typical)	158° to 165°C	$1.080 \pm .005^{\circ}\ddagger$
Trichlorethylene: tech. grade extraction grade	$\text{CHCl}=\text{CCl}_2$	-86.4°C (typical)	86.6° to 87.8°C 86.6° to 87.4°C	$1.469 \pm .002^{\circ}\S$ $1.474 \pm .002^{\circ}\S$
Trichlorobenzene	$\text{C}_6\text{H}_3\text{Cl}_3$	10°C max.	5°C incl. 216°C	$1.467 \pm .003^{\circ}\ddagger$

* Includes 2.5% methanol by weight to depress freezing point.

† 15.5°/15.5°C

‡ Becomes glass-like below room temperature.

† Last crystal point.

§ 15°/4°C

** 25°/15.5°C

What do you dissolve?

Any discussion of industrial solvents would be incomplete without at least a mention of *trichlorobenzene, tech.*

This Hooker material is a mixture of the 1,2,4- and 1,2,3-isomers of trichlorobenzene. A clear, almost colorless mobile liquid, it typically distills within 5°C between the limits of 213° and 219°C.

Like most Hooker chlorinated solvents, it is nonflammable.

For dissolving fats, oils, waxes, and certain resins, and as a crystallization solvent, it offers several specific advantages which we'd like to discuss with you one of these days.

In the meantime, in case you are not aware of the variety of special-purpose solvents you can get from Hooker, above is a partial list showing specifications to which they are made.

If you'd like more data on their properties, ask your Hooker salesman, or clip the coupon.

For more information on chemicals mentioned on this page, check here:

- New list of products—
Bulletin 100-A
- ortho*-Dichlorobenzene
- Methyl Cyclohexanol
- Monochlorobenzene
- Monochlorotoluene
- Trichlorethylene (technical and extraction grades)
- Cyclohexanol

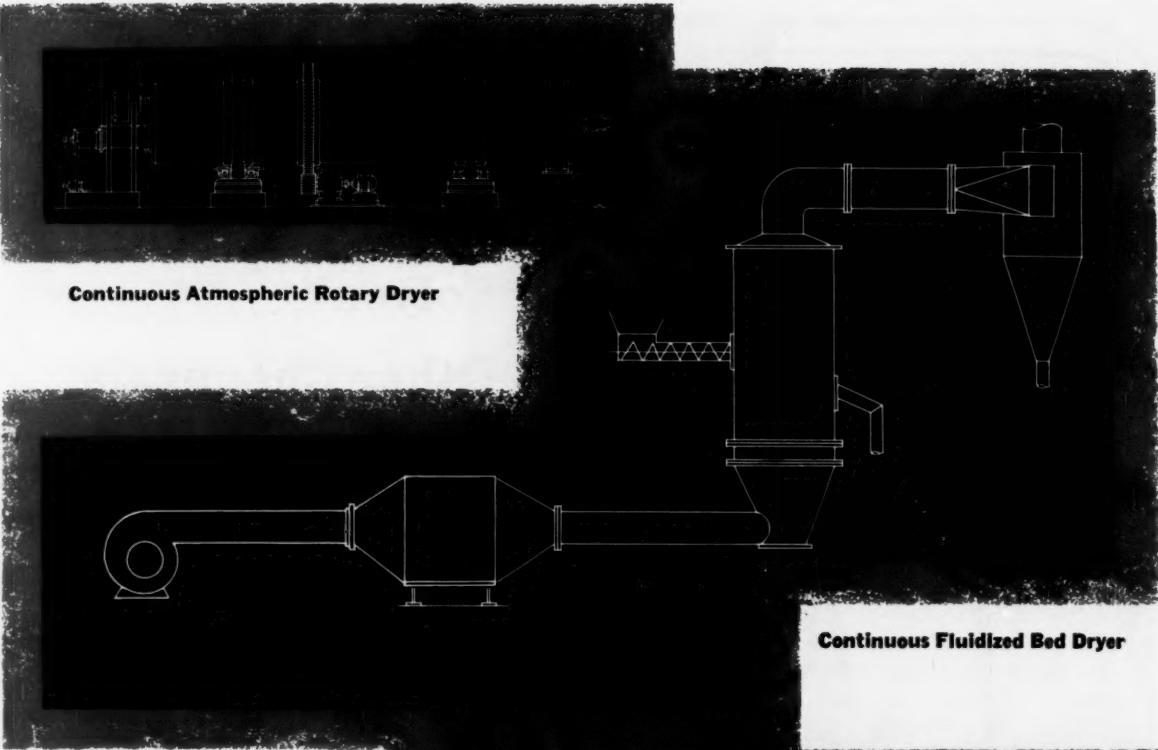
Clip and mail to us with your name, title, and company address. (When requesting samples, please use business letterhead.)

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PRODUCTION

How synthetics compare with natural fibers for work clothing

	CHEMICAL RESISTANCE			DURABILITY	LAUNDERING
	Acids	Alkalies	Solvents		
Nylon	Poor	Very good	Good	Very good	Good
Dacron	Good	Good	Very good	Good	Good
Orlon Acrilan Dynel	Very good	Good	Very good*	Good	Good
Cotton	Poor	Fair	Very good	Good	Good
Rayon	Poor	Fair	Good	Poor	Fair
Wool	Good	Poor	Very good	Poor	Fair

Synthetics Try Work Clothes On for Size

Competitive differences between apparel made of synthetic[†] and natural fibers are not nearly as striking as the differences (table above) between the two classes of fibers. But these differences are being used by synthetic fiber makers as the basis for their sales pitch. And chances are good that many chemical plant executives will hear such sales talks in coming weeks.

Reason: synthetic fiber makers who have been concentrating on nonindustrial markets are beginning to show a great deal of interest in the half-billion-dollar/year work-clothes field. They're convinced that chemical process plants, in particular, are a likely outlet for their wares.

Within the past few months, Du Pont and American Viscose, two old hands in the fiber field, have come out with new entries. Du Pont's 420 nylon (*CW Technology Newsletter*, July 6, p. 61) has been introduced

[†]In this context, the noncellulosics. A better split might be hydrophobics (generally all synthetics except rayon) and hydrophilics (cotton, rayon, wool). Acetate is generally not applicable to work clothes.

with an eye to increasing the service life of cotton work clothes. American Viscose has told stockholders that its new Avisco-XL rayon is superior to cotton in dry-strength and wear qualities. And Dow (Zefran), American Cyanamid (Creslan) and Tennessee Eastman (Verel) say they are testing their fibers for the industrial market.

But the work-clothes field has been a tough one to crack. Only about 2% of the 350 million lbs./year of fiber used in work clothes is synthetic (including rayon). A big reason for this is the conservative nature of the industrial buyer. Neither plant executive nor worker is easily swayed by promotional claims. Both are concerned with cost—cotton fiber at 35¢/lb. is hard to beat.

And the plant executive generally wants six months to a year (sometimes longer) of on-the-job testing before committing himself on any new fabric. Some synthetic fiber makers feel that buyers are too cautious in these re-

spects, miss out on long-term money-saving qualities of the synthetics.

One long-standing problem of the hydrophobic synthetics is their tendency to build up electrostatic charge—a real hazard in the presence of combustible solvents. This drawback can be partly offset by applying an antistatic chemical specialty during the finishing operation (*CW*, Sept. 8, '56, p. 94). Main problem here is lack of permanency, but improvements are being made all the time. Onyx Oil, for example, has two new nitrogenous anion-exchange resins that will withstand 20 to 80 launderings on fibers such as Dacron, Orlon and nylon.

A second solution is to blend the synthetic with sufficient hydrophilic fiber (cotton, rayon, wool) to keep static buildup below the danger level. (Actually, all fibers—even cotton—have detectable static, although no one considers it dangerous.)

Blending also overcomes other objections—e.g., uncomfortable feel, dif-

*Dynel dissolves in acetone.

PRODUCTION

ficulty in dyeing—to 100% synthetic garments. Any blend of a hydrophobic synthetic with a hydrophilic fiber results in a fabric that exhibits the properties of both fibers, roughly in the ratio of the blend. Fabric properties are not entirely predictable, however, since the textile processors can do a great deal, in the weaving and finishing steps, to alter them.

Three Big Properties: In general, fiber makers will try to make the most of the hydrophobics' three acknowledged strong points: resistance to chemicals; durability; ease of laundering. Here's how the three main hydrophobic fibers compare as material for plant clothing:

• **Nylon:** Paradoxically, although conventional 66 nylon holds its place as the strongest clothing fiber, its high resiliency causes it to form dimensionally unstable and poor-wearing fabrics when blended with cotton. Du Pont's new 420 nylon, designed for low resiliency and high strength, is said to have licked this problem. (A specific cotton blend wears 70% longer than 100% cotton work clothes, costs only 25% more. Mills now producing these new work clothes include Pepperell Mfg. Co., Cone Mills, and J. P. Stevens.)

Lack of acid resistance handicaps nylon in certain applications; but its alkali resistance is excellent and it has the favorable laundering properties of the other synthetics. Price of 66 and 420 nylons is about medium for synthetics: \$1.28/lb. But fiber prices give only a rough indication of relative fabric costs, because of the number of ways in which the mill can process the material.

• **Dacron:** Right behind nylon in strength is Du Pont's Dacron, which has the acid resistance nylon lacks. Dacron resists wrinkling, is fast-drying. It is particularly good for "drip-dry" fabrics. However, use in plant clothes has been retarded by the cost—\$1.51/lb.

• **Acrylics:** Somewhat weaker than their cousins, but still strong fibers, are the acrylics. This group includes "true" acrylics (at least 85% acrylonitrile: Du Pont's Orlon, Chemstrand's Acrilan) and dynel, Carbide's copolymer of acrylonitrile and vinyl chloride. Good wash-and-wear fibers, the acrylics excel in resistance to chemicals, especially acids. Acri-Chino (50% Acrilan/50% cotton)

overalls supplied by Big Smith Mfg. Co. reportedly outwear 100% cotton in acid-contact situations by seven to one, cost 65% more. Rayon blends suitable for acid-resistant uniforms are made by Burlington Industries (90% Orlon) and J. P. Stevens (70% and 90% Acrilan). Fiber prices are as low as \$1.18/lb.

Dynel also offers good resistance to most chemicals (except acetone). Dynel, at \$1.10/lb., is used in work clothing manufactured by Chem Wear, Inc. (Darien, Conn.), Freeland Mfg. Co. (Freeland, Pa.), Millburn Co. (Detroit), Topps Mfg. Co. (Rochester, Ind.) and Worklon, Inc. (New York).

The Big Difference: Chief hydrophilic in use is, of course, cotton. It is strong, washable and cheap (35¢/lb.), and is used in about 97-98% of industrial clothing. Drawbacks: low resistance to acids and alkalis, shrinkage (unless special treatment is applied),

relatively slow-drying and high-wrinking.

Although low-priced (30¢/lb.), rayon suffers from several drawbacks, including poor chemical resistance and low strength (still lower when wet). American Viscose's new Avisco-XL overcomes the strength problem, reportedly has a wet strength 70% higher than that of conventional rayon, with dry strength and fabric wearing qualities that beat cotton's.

Cost (about \$1.80/lb.), low alkali resistance, and the need for moth-and shrinkproofing all tend to work against wool in its battle against the acrylics, which can be processed to simulate many of wool's good features.

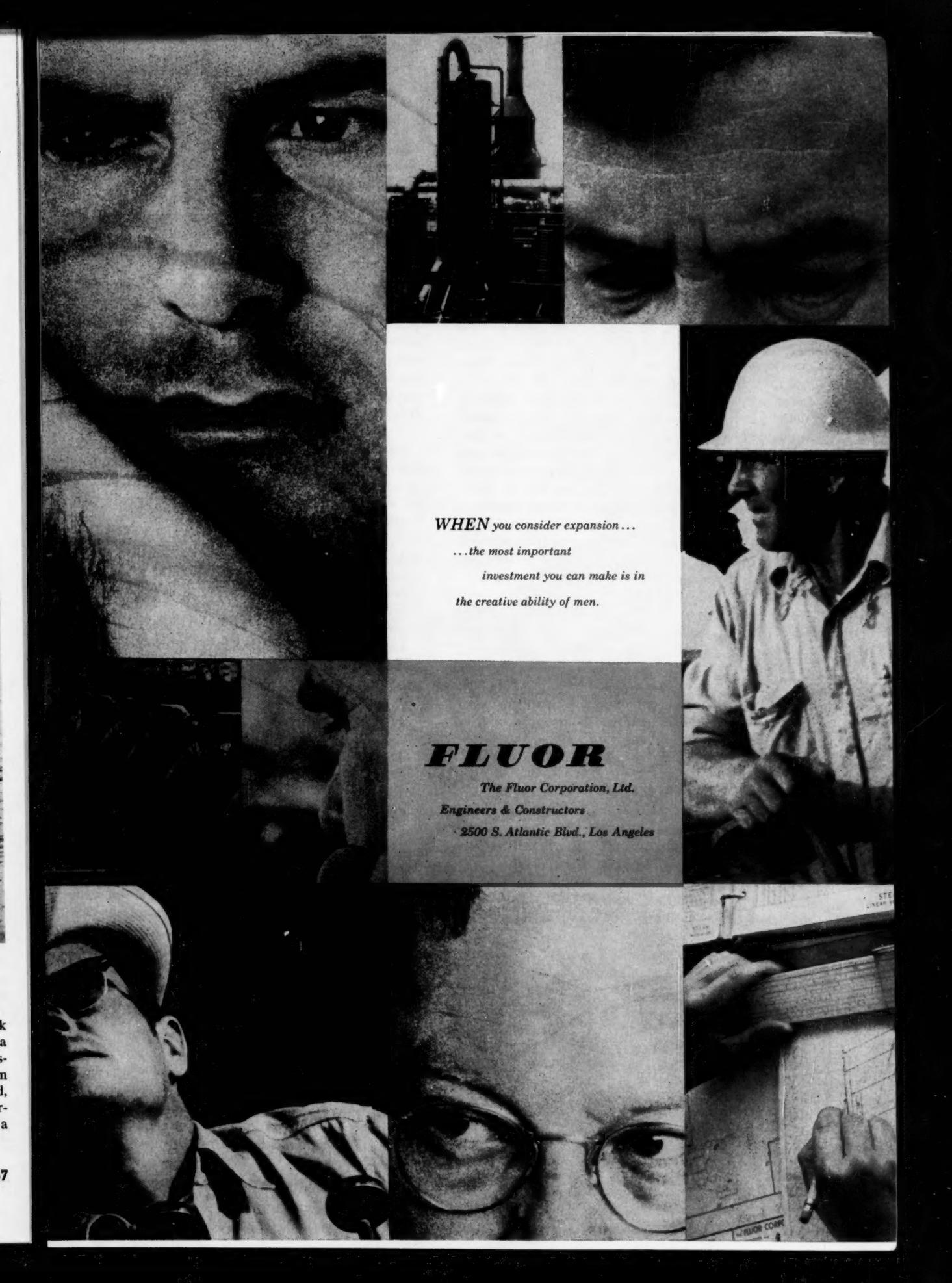
Just how much the synthetics can capitalize on these shortcomings of natural fibers remains to be seen. But there'll be a big push to get chemical workers to dress up in the products of their industry.



Tacoma Fish Get a Plastic Lifeline

Unlike the sea serpent to which it was likened by a local newspaper, this 300-ft. polyethylene pipeline serves a constructive purpose: pollution-control at Stauffer's Tacoma, Wash., superphosphate plant. The corrosion-resistant tube is shown floating on Commencement Bay recently, shortly be-

fore its weighted outer end was sunk into 50 ft. of water. At this depth, a 0.3% fluosilicic-acid solution discharged from the plant will not harm marine life. As a further safeguard, Stauffer releases the solution only during alternate hours of the day, at a rate of 250 gpm.

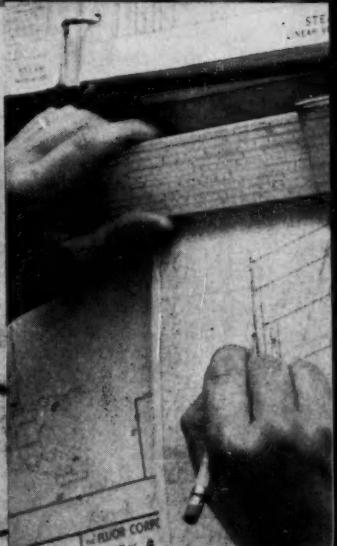


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EQUIPMENT

Vapor Fractometer: Perkin-Elmer Corp.'s Instrument Division (Norwalk, Conn.) will introduce the Model 184 vapor fractometer for continuous multi-component gas-chromatography analysis of process streams at next month's instrument automation conference and exhibition in Cleveland. The new instrument has three units: (1) an analyzer installed in the plant near the sampling point; (2) a programmer and (3) a recorder installed in the control room. Analyzer has explosionproof housing with two sections—the upper part has controls for keeping sample column, detector, sampling valve and carrier-gas lines within ± 0.1 C of operating temperatures in the 50-100 C range; the lower contains carrier-gas flow regulator, motor for Teflon sampling valve and optional liquid-sample vaporizer. Model 184 records one to four components on a bar chart that can be read directly in percent concentration. Additional programmer units, added in parallel, will increase the number of output channels. Field tests have been conducted on butadiene, alkylation feeds, ethylene, chlorinated hydrocarbons, refinery streams with olefins and paraffins from methane through pentanes and pentenes. Analysis of synthesis gas shows promise as another application.

Thickness Tester: The Sonizon SO-200 is a new portable tester made by Magnaflux Corp. (Chicago) for measuring the thickness of rigid materials (e.g., metals, glass, hard insulators) ultrasonically. Operator selects the proper crystal range, places probe on the test area, rotates read-out dial until harmonic lines match a flashing-light pattern, reads thickness directly from dial. SO-200 requires no warmup, measures thicknesses between 0.027 and 4 in. with $\pm 3\%$ accuracy.

Line-Operated pH Meter: Photovolt Corp. (New York) is out this month with Model 85 pH meter, which it says answers the growing demand for an inexpensive (\$105 with standard electrodes), process meter. Model 85 has a 3-in. scale with divisions of 0.2-pH unit, permits reproducible readings of 0.1-pH unit, operates on 100-125-volt, 50-60-cycle ac.

Safety Valves: The new 1900 and 2900 series safety valves for steam generator service offer a choice of 21 nozzle sizes and seven body sizes to eliminate oversizing and prevent draining of water from the boiler, says the manufacturer, Farris Engineering Corp. (Palisades Park, N. J.). Both series are top-guided, seminozzle, cast-iron types, have maximum pressures of 250 psig. at 450 F.

Dust Collector: The Day Sales Co. (Minneapolis) offers a new low-cost dust collection unit that combines the features of a cyclonic separator and a dust filter.

The unit is a modification of the Hersey type, uses high-velocity, reverse-air cleaning to remove dust deposited on the outside of felt filter sleeves. Dust-laden air flows in a cyclonic pattern, separating the heavy dust particles before entering the filter chamber. The unit is designed for continuous operation with efficiencies ranging up to 99.99% on submicron particle sizes.

Print Holder: The Roll-O-Print viewer, a new product of Aqua Sportsman, Inc. (Cincinnati), holds blueprints, drawings, photos, etc., up to 40-ft. long, for convenient viewing in an area of 40 x 48 in. Prints are rolled onto two rollers at ends of the Roll-O-Print frame; area to be viewed is cranked into view. Model A can be mounted on the wall or any flat surface; Model B is for mounting on a horizontal surface.

Fire Monitor: Chiksan Co.'s (Brea, Calif.) Intelli-Giant line of master-stream fire monitors is now offered in a new 3-in. diameter model that is recommended for volumes up to 1,000 gpm. The monitor will effectively throw a stream 280 ft., using a 1½-in. nozzle with a nozzle pressure of 115 psi. The new model permits one-man operation at the gun or from a remote station, has a horizontal sweep of 270 degrees and a vertical travel of 120 degrees, can be used with any standard nozzle, including fog nozzle, up to 2½ in.

Ladder-Truck: Faster and safer overhead building maintenance for 7- to 14-ft. heights is the claim made by Safe-Lad Mfg. Co. (Portland, Ore.) for its new M-6 mobile ladder-truck. Truck height is 77 in., length is 42 in., width is 26 in.; it gives an eye-level height of 11 ft. 6 in. and reaching level of 13 ft. Lock-on platform adds another foot. The M-6 has six steps, guard-rail protection on four sides. The lower work tray carries supplies; the upper work tray is adjustable to workers' waist level.

Conductivity Recorder: For recording electrolytic conductivity at locations where electrical power is not available, Industrial Instruments, Inc. (Cedar Grove, N.J.), is out with a battery-operated model that minimizes battery drain. The circular chart of the new recorder is driven by a clock mechanism, consumes no power. Electronic portions are completely transistorized to cut power consumption. Two 6-volt batteries supply the power. Batteries supplied with the recorder are said to allow continuous operation for two months. Instrument allows direct reading in micromhos.

High-Pressure Control Valve: High Pressure Equipment Co., Inc. (Erie, Pa.), is out with a new proportioning control valve with a longitudinal stem-lift that is in line with the piston and is said to provide greater accuracy. Sizes: $\frac{1}{8}$ to $\frac{1}{4}$ in. for pressures of 6,000-30,000 psi. Line air pressure: up to 100 psi.

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GIRDLER

SPECIALTIES



BY SYD KARSON

Triggered by boom in pet ownership, pet remedies are selling at \$15-million/year clip, putting

New Profits in the Changing Pet Business

When pet shop owners flock to Manhattan's New Yorker Hotel next week for the third annual trade show of the National Assn. of the Pet Industry, makers of chemical specialties for pets will be in close attendance. They count on a warm reception for their new products (pet shops have a particularly fad-conscious clientele); they'll offer tips on merchandising (few retailers need it more); and they'll comfort the pet-supply dealers who fear that supermarkets and other outlets are encroaching on their business.

There's a big market in the U.S. for pet supplies. Aside from the nearly

\$400-million/year market for pet foods, there's a \$10-15-million/year market* for such items as repellents, deworming medicines, tick killers, flea powders, soaps and shampoos. Household pet medicine (cough remedies, ear canker medicines, cold aids and tonics) alone have sales of \$3-5 million. And the market is growing steadily—per capita spending on pets is said to be 10 times what it was in the 1930s. Increasing numbers of birds and fish as pets has helped swell the market.

Favorites: Biggest by far of the pro-

*Exact market figures are lacking in the industry. *CW's* figure is an estimate based on some 15 industry estimates of the market.

prietary pet products are the insecticides, accounting for 40% of the total market. Included in this group are flea powders (25% of the market total); liquid soaps, shampoos and dry baths with anti-insect ingredients; tick powders and fly repellents.

Current flea powder formulations generally contain Malathion or rotenone, less often lindane or chlorophenol. So-called "flea collars" incorporate Rohm & Haas' Lethane into the collar material, or in an ointment applied to the collar. Shampoo formulations are similar to those for use on humans, often contain pine oil as the flea killer. Dry baths are soaps



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SPECIALTIES

that contain about 0.1% rotenone.

Packaging, rather than content, influences price—the general range of pet-product prices is 60-75¢/unit, although aerosols (6-oz. cans) are in the \$1.25/unit range. Cat-care items are generally cheaper.

Second-biggest sellers are worm capsules. The newer dewormers are generally made from piperazine adipate, which is much easier on pets than previously used compounds. Liquid shampoos, pine oil disinfectants and dips, and the various medical items are next-biggest sellers.

Chasers: Coming up in sales are repellents, used to keep pets away from a particular area (*CW*, July 23, '55, p. 58). They're usually made with oil of mustard, oil of nicotine, or oil of lemon; one aerosol formulation includes a combination of bone oil and paradichlorobenzene.

Repellents designed for cats are much the same as those for dogs, although sometimes weaker. The label must state whether the repellent should be used for dogs or cats—pet owners are particular about the specific label. "Customers, nowadays," says one pet shop owner, "must see that dog or cat picture on the label or they won't buy."

One new type of repellent gaining in popularity is designed to keep male dogs away from bitches in heat. Most often, a tablet containing cerophyllium as the active component is given to the bitch.

Formulators' Problems: One of the biggest problems of pet-insecticide makers is the development by the flea or tick of resistance to the insecticide. This leads to frequent changes in formulation of the products—e.g., dry flea powders were made with rotenone and pyrethrum before the war, were altered to use DDT after the war, then changed again to include chlordane. They now generally include Malathion.

California Spray-Chemical's new Ortho Dog Powder contains Malathion, methoxychlor and Captan (to fight fungus), is fairly representative of what formulators are using now.

Rotenone, although it has been replaced in many formulas, has not lost its effectiveness, but at three times the price of other insecticides, it has trouble competing. Whitmire Research Labs. (St. Louis) is one firm doing a brisk business selling a product that's

essentially its prewar rotenone formulation.

No Problem: Although bothered by formulation changes, pet-specialties makers are finding one new trend to their advantage—the growing brand awareness of pet owners. It's welcomed by manufacturers and merchandisers alike because it insures repeat business.

"This used to be a 'gimmick of the month' business," says one wholesaler. "You never had to worry about a year's guarantee on anything because nobody kept anything around that long."

Who's Who: Probably the biggest manufacturer of pet-specialty products—and one of the oldest—is Polk-Miller (Richmond, Va.), maker of Sergeant's products. William Cooper & Nephews (Chicago), with Pulpex products; Anchor Serum (St. Joseph, Mo.), with Pets Best; Lambert & Kay (Los Angeles); Whitmire Research Labs. (St. Louis); and Hilo Co. (Norwalk, Conn.) are some of the other leading manufacturers. Geislers and Hartz Mountain Products (New York) are top-selling companies in bird supplies. Barnett Products (Del Monte, Calif.) and Weco Products (Long Beach, Calif.) specialize in aquarium and fish supplies.

Two names newly associated with the pet-supplies industry are California Spray Chemical Co. (San Francisco) and Virginia Smelting (West Norfolk, Va.). VS has recently come out with a line of four aerosol pet products in its Petasol line, will likely add more soon. Trylon Products (Chicago), known for its bubble bath products for women, has also entered the pet field with Duet shampoo.

Who Sells 'em: The U.S. has about 5,000 pet shops, 3,000 of them independent and the rest in department and variety stores. Most of the grooming and remedy items are sold through drugstores, but the pet shop is still the major outlet for other pet specialties. Supermarkets are third in pet-supply sales, and growing fastest. Mail-order buying is negligible.

Several factors may soon put the pet shops above drugstores at the top of the list of pet-supply outlets, however. An effort is being made to consolidate the hodgepodge of associations dotting the business. Also, wholesalers are pitching in with merchandising aids—Capitol Pet Supply Co. (Wash-

ington, D.C.) provides customers with advice on modernizing their operations (pet shops reputedly lack merchandising know-how).

There's this, too: the pet shop can provide a customer with correct information about which product he should buy. This sort of information isn't usually available in self-service stores. The huge turnover in personnel in self-service outlets also prevents clerks from getting acquainted with a product.

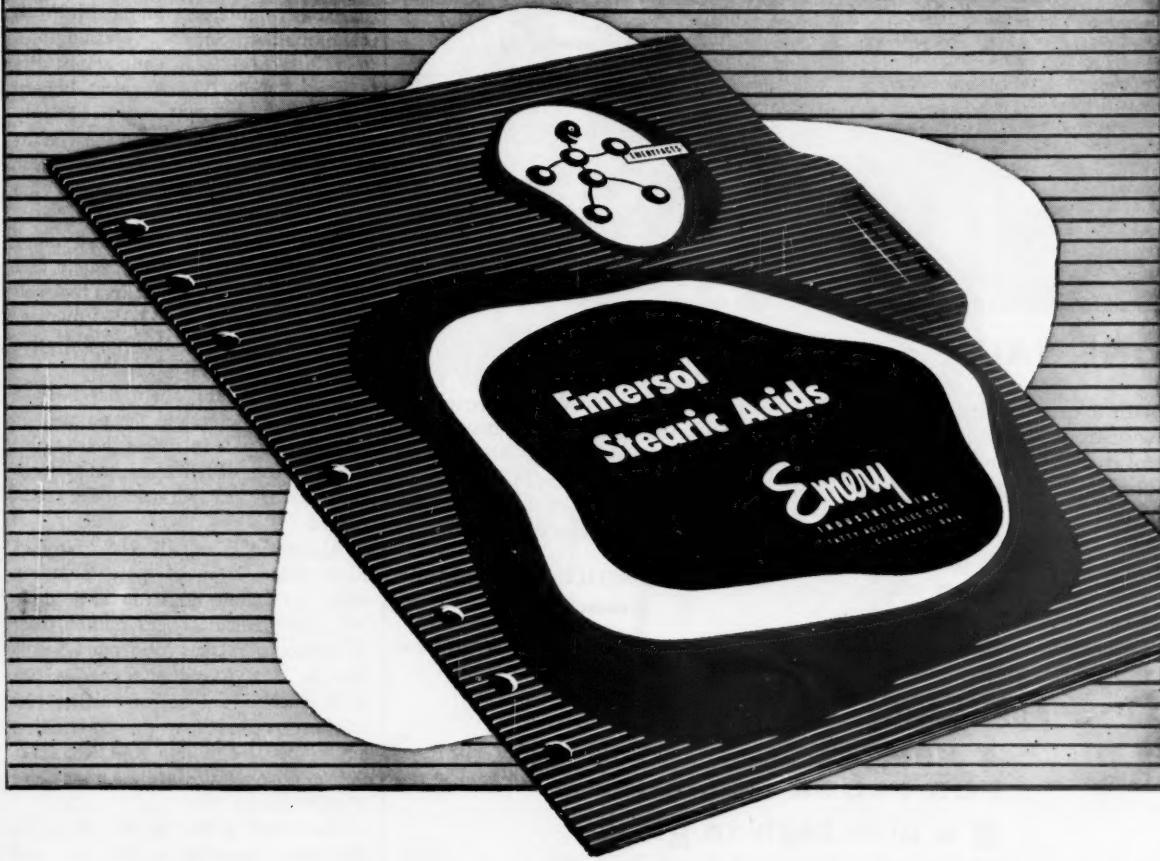
Altered Picture: To specialties makers contemplating entering the pet-supply business comes this comment from T. E. Duffy of Pet Chemicals Inc. (Miami, Fla.): "From my own personal observation, the shop that handles only pet supplies is doing a smaller portion of business each year. The garden-supply, feed and seed stores that put in a pet shop or pet shop supply section as a sideline are doing the best merchandising jobs and will, I believe, be the big sellers among independent dealers. Chain groceries and chain drugstores are fast getting into the pet-supply business and, of course, will do a terrific merchandising job. . . . The rack jobbers certainly have taken over a number of supermarkets. On the other hand, I know that there is a small trend for supermarket operators to set up racks themselves, thus getting a little larger profit."

Concerning the future of rack jobbers, one pet wholesaler said: "There's no question that the pet rack has become a popular feature where pet supplies are sold. But the problem has been that neither the merchant nor the supplier can get enough variety of items on the rack because the store that warrants a rack display usually is hard pressed for display space. That's the situation in supermarkets as well as in drugstores and hardware stores."

Jobbers Are Growing: Though most pet remedies are sold through the wholesale druggist, the pet-supply jobber is becoming increasingly important. There are about 180 of these jobbers now (averaging sales of \$167,500/year; some as much as \$1,250,000) and the number is growing—especially in the West. In the East, there were so few pet-supply jobbers not too long ago that manufacturers were forced to sell direct; but that's no longer the case.

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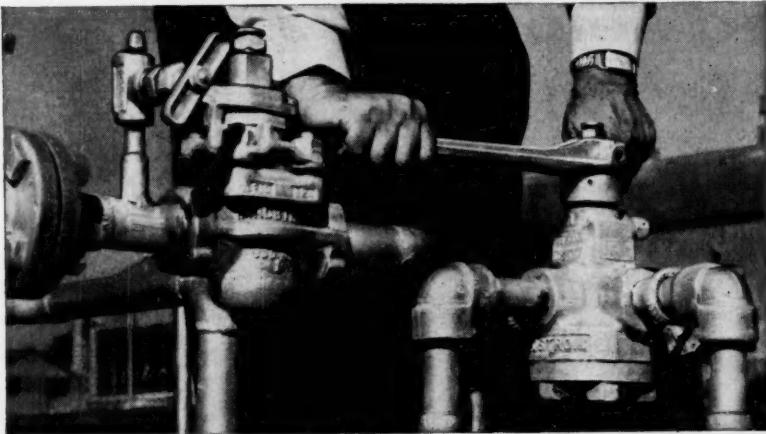
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SPECIALTIES

jobbers at present are Willis Distributors (Bridgeport, Conn.), largest and oldest in New England; Pioneer Pet Supply (Oak Park, Ill.), largest in the Central states; H. Trilling Co. (Chicago), second-largest in the Midwest; Capitol Pet Supply (Washington), largest in Middle Atlantic states; Pet Dealers Supply (Los Angeles), biggest on the West Coast; Arrow Pet Supply (Portland, Ore.), biggest in the Northwest; and Southern Pet Supplies (New Orleans), one of the largest in the Deep South.

These jobbers usually work on a margin of 10-25%, less freight and cost of handling. The retailers they sell to usually enjoy a 33.3% margin, though occasionally this margin runs as high as 50%.

Pet Population: There has been a tremendous increase in the number of all types of pets in recent years—and that growth is accelerating, except possibly as far as parakeets are concerned.

About 56% of all U.S. families have some kind of pet—including about 25 million dogs (up 25% since '47, 200% since '27); 27 million cats; 15 million parakeets (up from 1.5 million in '51); 6 million canaries (up 12% since '55); 3 million turtles; 120 million tropical fish (in 20 million aquariums); 12 million gold fish; 100,000 monkeys (sales are zooming) and 10,000 skunks.

The 'Mutt' Is the Market: Dogs are the most pampered of the pets, and the most money is spent on them. Most proprietary pet supplies are sold to the owners of other than purebred dogs.

It appears that owners of purebreds (about 10 million purebreds exist in the U.S.) have the idea that their pets are of high-strung and delicate temperament, requiring more care and better living than a "mutt." Consequently, about 85% of these owners won't fool around with flea powders and similar medicaments. They take ailing dogs to veterinarians, who generally use ethical preparations. This cuts deeply into the market available to pet specialties.

There will continue to be a small—and dwindling—market for fad items for pets (eyeglasses, mink collars, hearing aids, Christmas stockings, colognes, plaid vests, custom-made hats, Blue Cross insurance plans and life insurance), but the pet owner

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is becoming more sophisticated. The specialty maker who comes up with worthwhile products is far more likely to find a ready and growing market waiting for him.

Chlorophyll's Rival

Green "paints" for lawns, young chemical specialties that have thrived during current dry spells in the East, got their first setback last week. The U.S. Dept. of Agriculture strongly took exception to the advertising claims of one of the makers that USDA had tested and approved the material.

USDA was objecting to the claims—and the Federal Trade Commission has filed a complaint—made for Green Plasma, a product of I. G. Chemical Co. (New York) and Midland Chemical Co. In full-page ads in the garden pages of Eastern papers, I. G. Chemical in the past few months has extolled the miraculous lawn beauty made possible by applying the "wonder treatment used on the Capitol lawn in Washington, D. C. . . . that's been tested and approved by the U.S. Dept. of Agriculture."

USDA says it has never worked with the material. Moreover, ads say the compound has been used on Yankee Stadium—and a spokesman for the stadium told *CW* that Green Plasma, as such, had never been used.

Golfer's Paradise: What has been used by several of the institutions listed in the Green Plasma promotion, and by golf courses over the past few years, is a mixture of colorants, including malachite green and gentian violet. One such product is put out by Mallinckrodt Chemical under the name Oragreen.

Oragreen appears to be considerably cheaper to use than Green Plasma—it's used at a 1-oz./1,000 sq. ft. rate; retails for \$5.75/lb. Green Plasma, enough for 2,500 sq. ft., retails for \$3.98. Oragreen lasts, according to Mallinckrodt, a "couple of weeks" until rain and sun fade it.

Binder Added: Another product used for several years by lawn conscious people has been Magi Green, made by Lockrey Co. (Southampton, N.Y.). In order to overcome one fault of the straight dye products—the tendency to rub off onto shoes—Lockrey has incorporated a type of methyl cellulose binder (U.S. Patent 2,714,062). Moreover, a fertilizer is in-

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cluded, so that by the time the dye has faded, the grass should be naturally green.

A latex binder is utilized in another formulation for lawn care, developed by Henry Gardner and Richard Watson (Chevy Chase, Md.). This product (U.S. Patent 2,786,821) is not in commercial manufacture now, although it has been under test by a leading maker of butadiene-styrene latices for several years.

PRODUCTS

Nasal Spray: Sterling Drug, Inc. (New York), will offer Bayer Nasal Spray this September as a companion product to its Bayer Aspirin. The spray (a similar product is already available in Canada, *CW, March 5, '56, p. 78*), will be packaged in colored plastic containers—blue, green and brown—so that each family member can identify his own spray. The new preparation contains Neo-Synephrine (an antihistamine) and a cationic surface-active agent for deep penetration. Cost: 59¢; two for 98¢.

Paint Fights Bacteria: Nuodex Products, Division of Heyden Newport Chemical Corp. (Elizabeth, N.J.), is now marketing Nuozene, a self-sanitizing paint additive effective against both fungi and bacteria. The new paint additive is said to be effective in most types of paint formulations, lasts for the life of the paint and requires no special handling. Nuozene is also suggested for use in vinyl plastics, paper coatings and other materials in which mildew and bacteria cause economic loss.

Saran Resin: Saran Resin F220 is Dow Chemical's newest lacquer coating material. F220 offers lower viscosity than Dow's previously sold F120 and F242 resins. In addition, F220 is soluble in acetone—making it useful in coatings where low-cost solvents are desired. It's recommended for coating paper, polyethylene, cellophane and polyester films.

Gastric Analysis Simplified: The presence or absence of hydrochloric acid in the stomach can now be determined by Diagnex Blue, E. R.

Squibb's (New York) novel dye-resin indicator. The patient swallows two caffeine sodium benzoate tablets, to stimulate gastric secretion, then an hour later, takes the Diagnex Blue dissolved in a small amount of water. Visual comparison with color standards of a urine sample obtained two hours later reveals if hydrochloric acid is present. The test is qualitative—it does not indicate the amount of hydrochloric acid present. Diagnex Blue promises to replace the older "tube swallowing" method.

Seed Protection: Versatile tetramethyl thiuram disulfide, already used as an agricultural fungicide, a rubber vulcanization accelerator, and a soap bacteriostat, has turned up in a new role—as a bird and rodent repellent for use on tree seeds. The U.S. Dept. of Agriculture now suggests its use on the seeds of long leaf pine, 1/2 lb./6 lbs. of seed, so that the inexpensive system of tree planting—direct sowing—can be employed without wasteful loss of seeds.

TMTD is applied to the seeds by dipping them in a mixture of one-half TMTD and one-half asphalt roofing compound. A previously used system utilized tetramine, poisonous to rodents, as the protector (*CW, Oct. 16, '54, p. 72*).

Radiation-Resistant Resin: Maraset 341 is a new lead-filled epoxy resin formulation developed to provide a high-density, radiation-resistant casting compound. Marbette Corp. (New York) makes the new resin in a wide range of lead loadings and hardnesses, says the compound has good dimensional stability.

Unclinging Vine: Speco Inc. (Cleveland) has developed an aerosol spray that's claimed to prevent grass from sticking to lawn mower blades, cutter bars and wheels. Called Easy Cut, a 16-oz. can sells for \$2.49.

Antioxidant: Catalin Corp. (New York) has a new low-melting antioxidant that, when used in low concentrations, prevents oxidative degradation at high temperatures in polymeric materials. Tradename AC-6, the material is 2,2'-thiobis(4-methyl-6-tert-butyl phenol). Its low toxicity suggests use in stabilization of edible and inedible fats.

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August 31, 1957

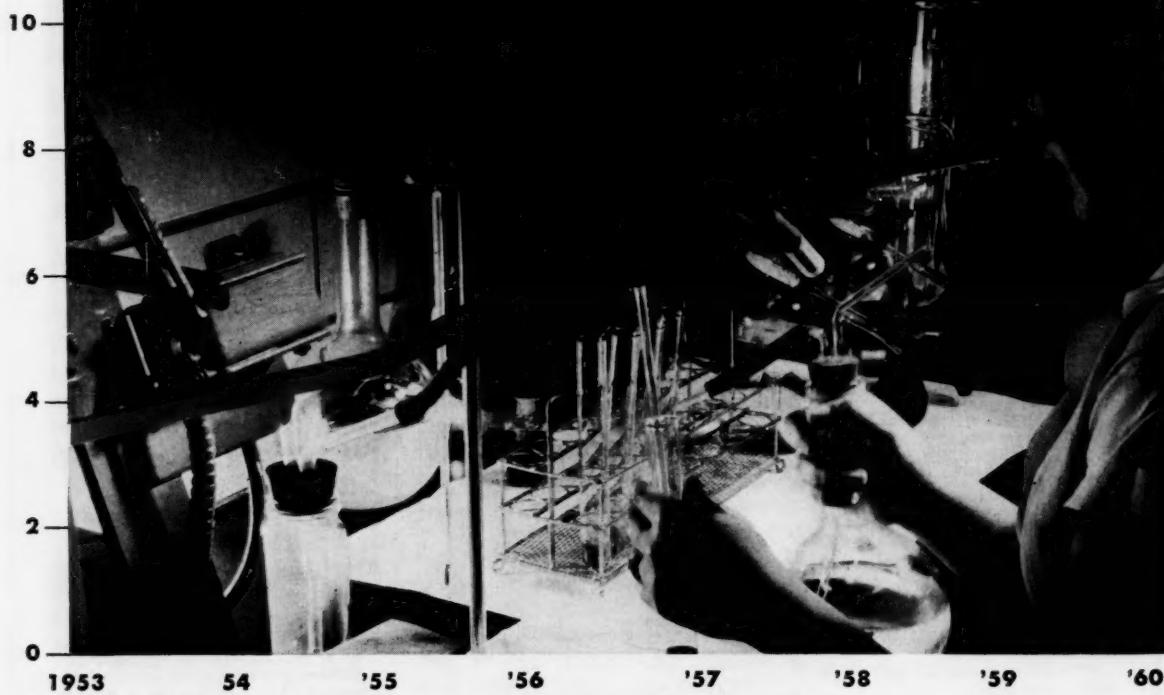
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CHARTING
BUSINESS

AUGUST 31, 1957

(billion dollars)

Research Expenditures of Manufacturing Industries



Source: McGraw-Hill Dept. of Economics.

Sowing for a Future New-Product Harvest

In 1960, U.S. manufacturers will spend \$9 billion for research and development, a 55% jump over last year's \$5.8 billion.

The chemical industry, a leader in research expenditures, will put an estimated \$617 million into research in '60—some 26% more than last year's outlay of \$498 million. The aircraft industry takes the lead with some \$3.2 billion set aside for development in '60, or about twice the amount spent in '56. Makers of electrical equipment, in second place, plan to spend about \$1.6 billion in '60.

What do these large sums of money spent for research mean to investors? New products—a potent investment lure. The chemical industry alone expects that about 16% of '60's chemical sales will be in new products. One spokesman for chemical manufacturers states that, due to research, about 10,000 new chemical products are made annually, 400 of which are commercially significant. The aircraft industry expects about 40% of '60's sales to be in newly developed products, while machinery and electrical equipment makers are counting on close to 20%.

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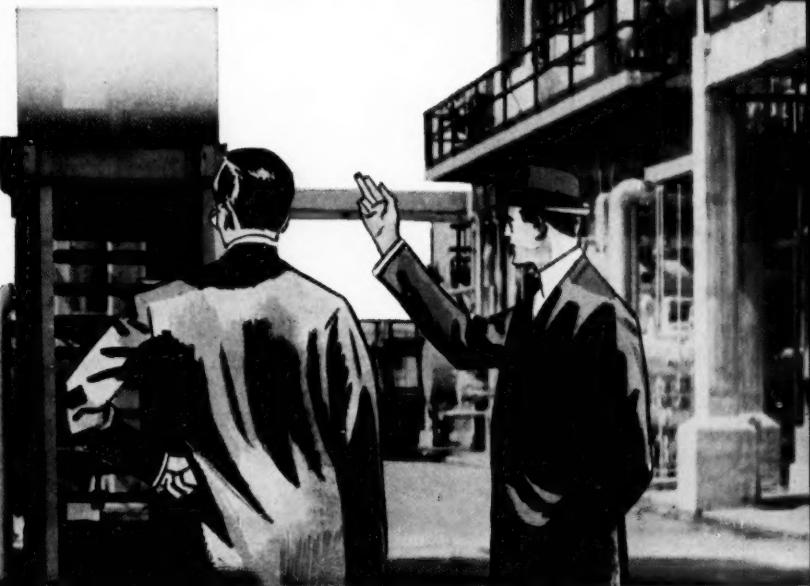
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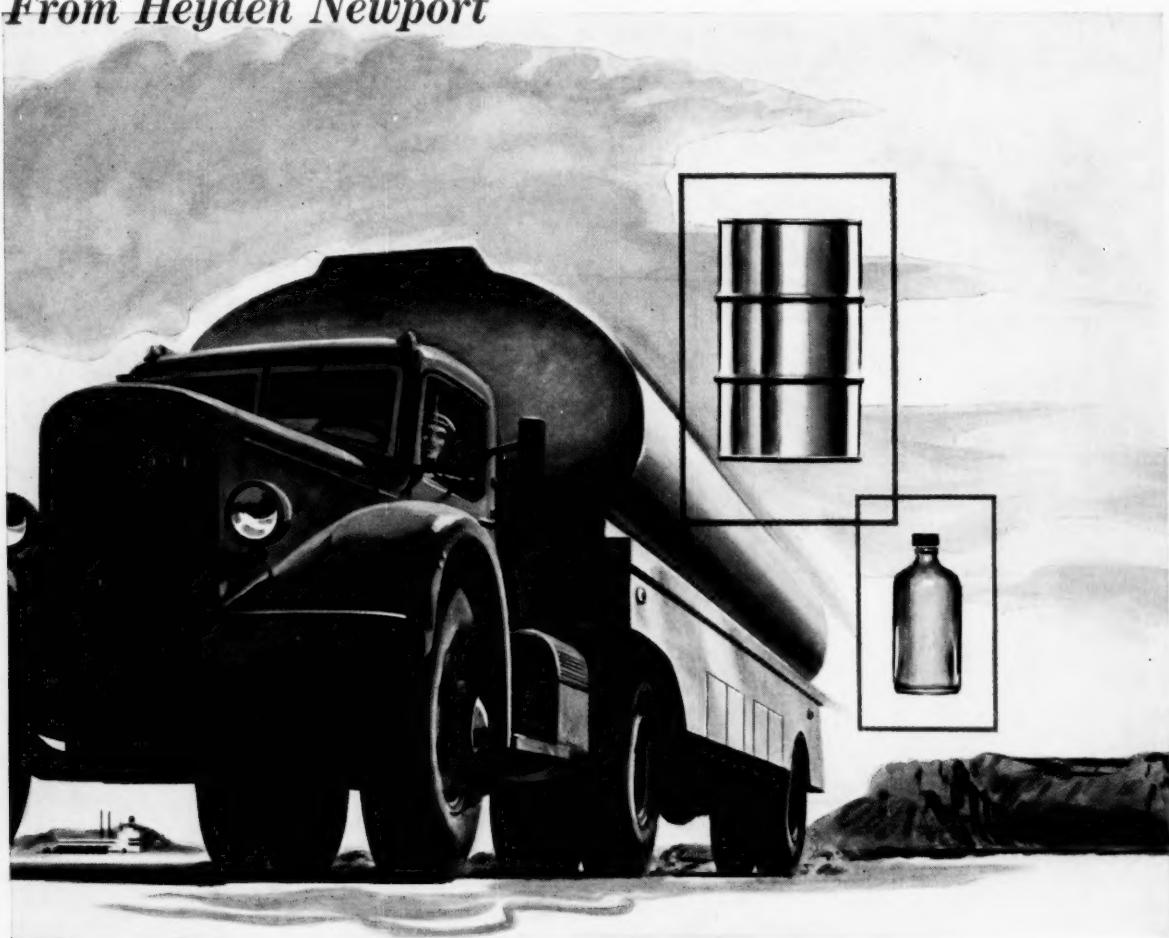
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